No. CLXXII.—New Series. October, 1883.

COPYRIGHT
OCT 3
1883
18094

THE

AMERICAN JOURNAL

OF THE

MEDICAL SCIENCES.

EDITED BY

I. MINIS HAYS, A.M., M.D.

PUBLISHED QUARTERLY.

PHILADELPHIA:
HENRY C. LEA'S SON & CO.,
Nos. 706 & 708 Sansom Street.

LONDON: TRÜBNER & CO. | PARIS: BOSSANGE & CIE.

1883.

PRICE—Five Dollars a Year, Free of Postage.

Entered according to the Act of Congress, in the year 1883, by Henry C. Lea's Son & Co., in the Office of the Librarian of Congress. All rights reserved.
Entered at the Post-Office at Philadelphia as Second-class matter.

NEW AND FORTHCOMING MEDICAL WORKS

BUMSTEAD AND TAYLOR ON VENEREAL DISEASES—New Edition—In a few days.

The Pathology and Treatment of Venereal Diseases. Including the results of recent investigations upon the subject. By F. J. BUMSTEAD, M.D., LL.D., Late Professor of Venereal Diseases at the College of Physicians and Surgeons, New York, etc., and R. W. TAYLOR, A.M., M.D., Prof. of Venereal and Skin Diseases in the University of Vermont. Fifth edition, revised and largely rewritten, by Dr. Taylor. In one large and handsome octavo volume of about 900 pages, with about 150 illustrations.

PARRISH'S PHARMACY—New Edition—In Press.

A Treatise on Pharmacy: designed as a Text-book for the Student, and as a Guide for the Physician and Pharmaceutist. With many Formulæ and Prescriptions. By EDWARD PARRISH, Late Professor of the Theory and Practice of Pharmacy in the Philadelphia College of Pharmacy. Fifth edition, thoroughly revised, by THOMAS S. WIEGAND, Ph.G. In one handsome octavo volume of about 1000 pages, with about 300 illustrations.

REMSEN'S CHEMISTRY—New Edition—In Press.

Principles of Theoretical Chemistry, with special reference to the Constitution of Chemical Compounds. By IRA REMSEN, M.D., Ph.D., Professor of Chemistry in the Johns Hopkins University, Baltimore. New and revised edition. In one handsome royal 12mo. volume of about 250 pages.

STILLÉ AND MAISCH'S NATIONAL DISPENSATORY—New Edition—In Press.

The National Dispensatory: Containing the Natural History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognized in the Pharmacopœias of the United States Great Britain and Germany, with numerous references to the French Codex. By A. STILLÉ, M.D., LL.D., Professor of the Theory and Practice of Medicine and of Clinical Medicine in the University of Pennsylvania, and J. M. MAISCH, Phar. D., Professor of Materia Medica and Botany in Philadelphia College of Pharmacy, Secretary to the American Pharmaceutical Association. Third edition, thoroughly revised and greatly enlarged. In one magnificent imperial octavo volume of about 1600 pages, with several hundred fine engravings.

STUDENTS' SERIES OF MANUALS.

A Series of Fifteen Manuals, for the use of Students and Practitioners of Medicine and Surgery. They will be written by eminent Teachers or Examiners, and will be issued in pocket-size 12mo. volumes of 300-500 pages, richly illustrated and at a low price. The first of the series, *Elements of Histology*, by E. KLEIN, F.R.S., is just ready, in one volume of 360 pages, with 181 engravings. Limp cloth, red edges, $1.50. The following volumes may now be announced: PEPPER'S *Surgical Pathology*, TREVES' *Surgical Applied Anatomy*, POWER'S *Human Physiology*, RALFE'S *Clinical Chemistry*, and CLARKE and LOCKWOOD'S *Dissector's Manual* (*Shortly*). ROBERTSON'S *Physical Physiology*, BRUCE'S *Materia Medica and Therapeutics*, BELLAMY'S *Operative Surgery*, and BELL'S *Comparative Physiology and Anatomy*. (*In active preparation.*)

RICHARDSON'S PREVENTIVE MEDICINE—In Press.

Preventive Medicine. B. W. RICHARDSON, M.A., M.D., LL.D., F.R.S., F.S.A., Fellow of the Royal College of Physicians, London. In one octavo volume of about 750 pages.

CLOUSTON ON INSANITY—Preparing.

Clinical Lectures on Mental Diseases. By THOMAS S. CLOUSTON, M.D., F.R.C.P., L.R.C.S., Lecturer on Mental Diseases in the University of Edinburgh. In one octavo volume, illustrated with woodcuts and chromo-lithographic plates.

DUJARDIN-BEAUMETZ'S THERAPEUTICAL DICTIONARY—Preparing.

Dictionary of Therapeutics, Materia Medica, Pharmacology, Toxicology and Mineral Waters. By Professor DUJARDIN-BEAUMETZ. Translated with notes and additions.

MITCHELL ON NERVOUS DISEASES—New Edition—Preparing.

Lectures on Diseases of the Nervous System; Especially in Women. By S. WEIR MITCHELL, M.D., Physician to Orthopædic Hospital and the Infirmary for Diseases of the Nervous System, Philadelphia, etc. Second edition. In one very handsome 12mo. volume of about 250 pages.

HENRY C. LEA'S SON & CO., Philadelphia.

NEW AND FORTHCOMING MEDICAL WORKS.

GRAY'S ANATOMY—New Edition—Just Ready.

Anatomy, Descriptive and Surgical. By HENRY GRAY, F.R.S., Lecturer on Anatomy at St. George's Hospital, London. With an Introduction on General Anatomy and Development by T. HOLMES, M.A., Surgeon to St. George's Hospital. Edited by T. PICKERING PICK, F.R.C.S., Surgeon and Lecturer on Anatomy at St. George's Hospital, London, Examiner in Anatomy, Royal College of Surgeons of England. A new American from the tenth enlarged and improved London edition. To which is added the second American, from the latest English edition of LANDMARKS, MEDICAL AND SURGICAL, by LUTHER HOLDEN, F.R.C.S. In one imperial octavo volume of 1023 pages, with 564 large and elaborate engravings on wood. Cloth, $6; leather, $7; very handsome half Russia, raised bands, $7.50.

This work covers a more extended range of subjects than is customary in the ordinary text-books, giving not only the details necessary for the student, but also the application of those details to the practice of medicine and surgery. It thus forms both a guide for the learner and an admirable work of reference for the active practitioner. The engravings form a special feature of the work, many of them being the size of nature, nearly all original, and having the names of the various parts printed on the body of the cut, in place of figures of reference with descriptions at the foot. Combining, as it does, a complete Atlas of Anatomy with a thorough treatise on systematic, descriptive and applied Anatomy, the work will be found of great service to all physicians who receive students in their offices, relieving both preceptor and pupil of much labor in laying the groundwork of a thorough medical education.

Landmarks, Medical and Surgical, by the distinguished Anatomist, Mr. Luther Holden, has been appended to the present edition as it was to the previous one. This work gives in a clear, condensed and systematic way all the information by which the practitioner can determine from the external surface of the body the position of internal parts.

ALLEN'S ANATOMY. Section V. Nervous System—In a few days.

A System of Human Anatomy, Including its Medical and Surgical Relations. For the Use of Practitioners and Students of Medicine. By HARRISON ALLEN, M.D., Professor of Physiology in the University of Pennsylvania. With an Introductory Chapter on Histology. By E. O. SHAKESPEARE, M.D., Ophthalmologist to the Philadelphia Hospital. In one large and handsome quarto volume of about 600 double-columned pages, with 380 illustrations on 109 lithographic plates, many of which are in colors, and about 100 engravings in the text. In six Sections, each in a portfolio. Section I. HISTOLOGY, Section II. BONES AND JOINTS, Section III. MUSCLES AND FASCIÆ, Section IV. ARTERIES, VEINS AND LYMPHATICS (*Just Ready*). Section V. NERVOUS SYSTEM (*In a few days*). Section VI. ORGANS OF SENSE, OF DIGESTION AND GENITO URINARY ORGANS (*In Press*). Price, per Section, $3.50. *For sale by subscription only.*

It is to be considered a study of applied Anatomy in its widest sense—a systematic presentation of such anatomical facts as can be applied to the practice of medicine as well as of surgery. Our author is concise, accurate and practical in his statements, and succeeds admirably in infusing an interest into the study of what is generally considered a dry subject. The illustrations are made with great care, and are simply superb. There is as much of practical application of anatomical points to the every-day wants of the medical clinician as to those of the operating surgeon. In fact, few general practitioners will read the work without a feeling of surprised gratification that so many points, concerning which they may never have thought before, are so well presented for their consideration. It is a work which is destined to be the best of its kind in any language.—*Medical Record*, Nov. 25, 1882.

COATS' PATHOLOGY—Just ready.

A Treatise on Pathology. By JOSEPH COATS, M.D., F.F.P.S., Pathologist to the Glasgow Western Infirmary. In one handsome octavo volume of 829 pages, with 339 beautiful illustrations. Cloth, $5.50; leather, $6.50.

Within the limits of a single volume the Author presents a complete text-book of General Pathology and Pathological Anatomy—two departments of a single science which, to the great inconvenience of students, it has hitherto been the custom to treat independently. Throughout the work much space is devoted to Clinical Pathology. While the Author has availed himself of all the literature of the subject, including Ziegler's recent work, he has mainly relied upon his long experience as a pathologist and teacher for the matter here gathered and for the manner of its presentation.

ATTFIELD'S CHEMISTRY—New Edition—Just ready.

Chemistry, General, Medical and Pharmaceutical; Including the Chemistry of the U. S. Pharmacopœia. A Manual of the General Principles of the Science, and their Application to Medicine and Pharmacy. By JOHN ATTFIELD, Ph.D., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, etc. A new American from the tenth English edition, specially revised by the Author. In one handsome royal 12mo. volume of 728 pages, with 87 illustrations. Cloth, $2.50; leather, $3.

BLOXAM'S CHEMISTRY—Just ready.

Chemistry, Inorganic and Organic. By CHARLES L. BLOXAM, Professor of Chemistry in King's College, London. New American from the fifth London edition, thoroughly revised and much improved. In one very handsome octavo volume of about 700 pages, with about 300 illustrations. Cloth, $3.75; leather, $4.75.

HENRY C. LEA'S SON & CO., Philadelphia.

NEW MEDICAL WORKS.

WELLS ON THE EYE—New Edition—Just Ready.

A Treatise on Diseases of the Eye. By J. Soelberg Wells, F.R.C.S., Professor of Ophthalmology in King's College Hospital, London, etc. Fourth American, from the third London edition. Thoroughly revised, with copious additions, by Charles S. Bull, M.D., Surgeon and Pathologist to the New York Eye and Ear Infirmary. In one large and very handsome octavo volume of 822 pages, with 257 illustrations on wood, six colored plates, and selections from the Test-types of Jaeger and Snellen. Cloth, $5; leather, $6; very handsome half Russia, raised bands, $6.50.

This magnificent work is *par excellence* the standard work of the times on the important subjects of which it treats. It is absolutely necessary for the physician to have an acquaintance with the pathology and therapeutics of the eye. From no source can he more accurately derive this needed knowledge than from the volume before us.—*Medical and Surgical Reporter*, August, 1883.

NETTLESHIP ON THE EYE—New Edition—Just Ready.

The Student's Guide to Diseases of the Eye. By Edward Nettleship, F.R.C.S., Ophthalmic Surgeon and Lecturer on Ophthalmic Surgery at St. Thomas' Hospital, London. New edition. With a Chapter on the Detection of Color Blindness, by William Thomson, M.D., Ophthalmologist to the Jefferson Medical College. In one royal 12mo. volume of 416 pages, with 138 illustrations. Cloth, $2.00.

This admirable guide bids fair to become the favorite text-book on ophthalmic surgery with students and general practitioners. It bears throughout the imprint of sound judgment combined with vast experience. The illustrations are numerous and well chosen. This book, within the short compass of about 400 pages, contains a lucid exposition of the modern aspect of ophthalmic science.—*Medical Record*, June 23, 1883.

STIMSON ON FRACTURES—Just Ready.

A Practical Treatise on Fractures. By Lewis A. Stimson, B.A., M.D., Professor of Pathological Anatomy at the University of the City of New York, Surgeon and Curator to Bellevue Hospital, Surgeon to the Presbyterian Hospital, New York, etc. In one very handsome octavo volume of 598 pages, with 360 beautiful illustrations. Cloth, $4.75; leather, $5.75.

The author gives in clear language all that the practical surgeon need know of the science of fractures—their etiology, symptoms, process of union and treatment—according to the latest developments. On the basis of mechanical analysis the author accurately and clearly explains the clinical features of fractures, and by the same method arrives at the proper diagnosis and rational treatment. A thorough exposition of the pathological anatomy and of the various modes of procedure makes the book full of value for every practitioner. The diction is simple, clear and vivid. Wherever desirable, brief clinical histories are introduced, which, being skilfully chosen to illustrate particular points, attest the rich experience of the author. An especial attraction of the book is the numerous beautifully executed illustrations.—*Centralblatt für Chirurgie*, May 19, 1883.

HYDE ON THE SKIN—Just Ready.

A Practical Treatise on Diseases of the Skin. For the use of Students and Practitioners. By James Nevins Hyde, A.M., M.D., Professor of Dermatology and Venereal Diseases in Rush Medical College, Chicago. In one handsome octavo volume of 570 pages, with 66 beautiful and elaborate illustrations. Cloth, $4.25; leather, $5.25.

The author has given the student and practitioner a work admirably adapted to the wants of each. He recognizes no specific or routine remedies; none the less will it be found that his treatment is thoroughly satisfactory in its completeness and practical minuteness. We know of no more judicious guide to be followed by the practitioner in the management of the most unmanageable affections of this class. We can heartily commend the book as a valuable addition to our literature and a reliable guide to students and practitioners in their studies and practice. —*Amer. Journ. of Med. Sciences*, July, 1883.

TAYLOR'S PRINCIPLES AND PRACTICE OF MEDICAL JURISPRUDENCE—New Edition—Just Ready.

The Principles and Practice of Medical Jurisprudence. By Alfred S. Taylor, M.D., Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital, London. Third edition. In two handsome octavo volumes, containing 1416 pages, with 188 illustrations. Cloth, $10; leather, $12.

When a work so well known and of such acknowledged excellence as Taylor's Jurisprudence appears in a new edition, it is scarcely necessary to do more than to announce the fact as evidence at once of the high esteem in which these volumes are held and of the steadily growing interest which the subject of which they treat is developing. Any elaborate analysis or review of these writings is certainly superfluous, for they long ago took a leading place as a standard treatise on forensic medicine, and they may well be indifferent alike to the praise and the disparagement of a new generation of critics.—*Boston Med. and Surg. Journ.*, July 19, 1883.

HENRY C. LEA'S SON & CO., Philadelphia.

HENRY C. LEA'S SON & CO.'S MEDICAL AND SURGICAL PUBLICATIONS.

POLITZER ON THE EAR—Just Ready.

A Text-Book of the Ear and its Diseases. By ADAM POLITZER, M.D., Imperial Royal Professor of Aural Therapeutics in the University of Vienna. Translated at the Author's request by JAMES PATTERSON CASSELLS, M.D., M.R.C.S. In one handsome octavo volume of 800 pages, with 257 original illustrations. Cloth, $5.50.

Professor Politzer's well-known reputation as one of the first authorities on diseases of the ear will lead the reader to expect something more than an ordinary text-book in a work that bears his name, and he will not be disappointed. The anatomy, physiology, pathology, therapeutics and bibliography of the ear are so ably and thoroughly presented that he who has carefully read this imposing volume can feel sure that very little of interest or value in the past or present of aural surgery has escaped him.—*Am. Jour. of the Med. Sciences*, July, 1883.

GROSS' SYSTEM OF SURGERY—Sixth Edition.

A System of Surgery. Pathological, Diagnostic, Therapeutic and Operative. By SAMUEL D. GROSS, M.D., LL.D., D.C.L. Oxon., LL.D. Cantab., Emeritus Professor of Surgery in the Jefferson Medical College of Philadelphia. Sixth edition, thoroughly revised, and greatly improved. In two large and beautifully printed imperial octavo volumes, containing 2382 pages, illustrated by 1623 engravings. Strongly bound in leather, raised bands, $15; half Russia, raised bands, $16.

That Professor Gross' work worthily occupies a standard position is the just reward of the intelligent, conscientious and persevering labor which he has for many years bestowed upon the study and practice of his profession, and of the ability and good judgment with which he has investigated the data of others as well as his own conclusions, and of the care with which he has applied his knowledge to practice.—*The British Medical Journal*, March 24, 1883.

TIDY'S LEGAL MEDICINE.

Legal Medicine. VOLUME I. Embracing Evidence, The Signs of Death, Identity, The Causes of Death, The Post-mortem, Sex, Monstrosities, Hermaphrodism, Expectation of Life, Presumption of Death and Survivorship, Heat and Cold, Burns, Lightning, Explosives, Starvation. By CHARLES MEYMOTT TIDY, M.B., F.C.S., Professor of Chemistry and of Forensic Medicine and Public Health at the London Hospital, etc. Making a very handsome imperial octavo volume of 664 pages, with 2 beautifully colored plates. Cloth, $6.00; leather, $7.00.

He whose inclinations or necessities lead him to assume the functions of a medical jurist wants a book encyclopædic in character, in which he may be reasonably sure of finding medico-legal topics discussed with judicial fairness, with sufficient completeness, and with due attention to the most recent advances in medical science. Mr. Tidy's work bids fair to meet this need satisfactorily. The fact that the very numerous illustrative cases are drawn from many sources, and are not limited to the author's own experience, and the additional fact that they are brought down to a very recent date, give them, for purposes of reference, a very obvious value.—*Boston Med. and Surg. Jour.*, Feb. 8, 1883.

FARQUHARSON'S THERAPEUTICS—Third Edition.

A Guide to Therapeutics and Materia Medica. By ROBERT FARQUHARSON, M.D., Lecturer on Materia Medica at St. Mary's Hospital Medical School. Third American edition, specially revised by the Author. Enlarged and adapted to the United States Pharmacopœia by FRANK WOODBURY, M.D. In one very handsome 12mo. volume of 524 pages. Cloth, $2.25.

A book on therapeutics for which there has been a *bona fide* professional demand for three editions in five years must be a good book, and this is the indorsement that has been given to Farquharson's Therapeutics and Materia Medica by the medical fraternity in the United States. The third revision is marked by the same conscientious attention to detail and precision that gave the other issues of the book its good standing. As a compend of reliable therapeutics and materia medica, this third edition of Farquharson and Woodbury may be counted as the best in the English language.—*American Practitioner*, May, 1883.

BARTHOLOW ON ELECTRICITY—Second Edition.

A Practical Treatise on the Applications of Electricity to Medicine and Surgery. By ROBERTS BARTHOLOW, A.M., M.D., LL.D., Professor of Materia Medica and General Therapeutics in the Jefferson Medical College of Philadelphia, etc. Second edition. In one very handsome octavo volume of 292 pages, with 109 illustrations. Cloth, $2.50.

The second edition of this work following so soon upon the first would in itself appear to be a sufficient announcement; nevertheless, the text has been so considerably revised and condensed, and so much enlarged by the addition of new matter, that we cannot fail to recognize a vast improvement upon the former work. The author has prepared his work for students and practitioners—for those who have never acquainted themselves with the subject, or, having done so, find that after a time their knowledge needs refreshing. We think he has accomplished this object. The book is not too voluminous, but is thoroughly practical, simple, complete and comprehensible. It is, moreover, replete with numerous illustrations of instruments, appliances, etc.—*Med. Record*, Nov. 15, 1882.

HENRY C. LEA'S SON & CO., Philadelphia.

THE MEDICAL NEWS.

A National Weekly Periodical, containing in the 28-32 Quarto Pages of each Number, more Reading Matter than any other Medical Weekly in America.

Uniting the scholarship of a weekly magazine with the energy of a daily newspaper, The Medical News renders a service of especial value to the profession. As a magazine, it contains *Original Articles* and *Lectures* by the ablest writers and teachers of the day, judicious *Excerpts* and *Translations* from the medical periodicals of the world, *Notes of Practice* from the leading *Hospitals*, and numerous *Editorials* from the pens of a large and able Editorial Board. As a newspaper, it maintains a *Corps of Reporters and Correspondents*, covering all the medical centres of the globe, and receives by *Telegraph* prompt and accurate reports of *Society Meetings* and other matters of *Immediate Interest*. In short, the pages of The News include everything necessary to keep the profession informed of the incessant advances in medical knowledge made in all parts of the world.

The American Journal of the Medical Sciences.

A Quarterly, Published on the first days of January, April, July and October, each number containing over 300 large octavo pages, fully illustrated.

Since 1820 The American Journal has occupied the foremost place among the medical periodicals of the world, and now closes the eighty-sixth volume of its new series, with every prospect of continued usefulness. To-day it stands prëeminent as the only journal capable of presenting elaborate *Original Articles* on every branch of medical science. The *Review Department* contains discerning and impartial critiques of prominent new works, together with numerous analytical and bibliographical notices, giving a full survey of medical literature. The *Quarterly Summary of Improvements and Discoveries in the Medical Sciences*, classified and arranged under various heads, furnishes a complete digest of medical progress abroad and at home.

SUBSCRIPTION RATES—Postage Paid.

The Medical News, in advance, ...	$5.00
The American Journal of the Medical Sciences, in advance, ...	5.00

COMMUTATION RATES—Postage Paid.

The Medical News, and The American Journal of the Medical Sciences, in advance, ...	$9.00

Taken together, the Journal and News combine the elaborate preparation that can be devoted to a quarterly, with the prompt conveyance of intelligence by the weekly. Duplication of matter is, by special management, rendered impossible. For the sum of NINE DOLLARS, in advance, the subscriber receives a weekly and a quarterly journal, representing the most advanced state of the medical sciences, and together containing an equivalent of more than 4000 large octavo pages, stored with the choicest material, original and selected, that can be supplied by the best medical talent of both hemispheres.

Subscribers can obtain, at the close of each volume, cloth covers for The Journal *(two annually), and for* The News *(two annually), free by mail, by remitting Ten Cents for each* Journal *cover, and Fifteen Cents for each* News *cover.*

☞ The safest mode of remittance is by bank check or postal money order, drawn to the order of the undersigned; where these are not accessible, remittances for subscriptions may be sent at the risk of the publishers by forwarding in *registered* letters. Address,

HENRY C. LEA'S SON & CO., Philadelphia.

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR OCTOBER, 1883.

CONTRIBUTORS TO THIS VOLUME.

NISHAN ALTOUNIAN, M.D., *of Turkey in Asia.*
SAMUEL ASHHURST, M.D., *Surgeon to the Children's Hospital, Philadelphia.*
I. E. ATKINSON, M.D., *Professor of Pathology in the University of Maryland.*
LOUIS W. ATLEE, M.D., *of Philadelphia, Pa.*
EDWARD T. BRUEN, M.D., *Demonstrator of Clin. Medicine in University of Penna.*
C. B. BURR, M.D., *Asst. Physician to the Eastern Michigan Asylum, Pontiac, Mich.*
T. R. CHAMBERS, M.D., *of East Orange, N. J.*
WILLIAM S. CHEESMAN, M.D., *of Auburn, New York.*
J. SOLIS COHEN, M.D., *Professor of Laryngology in Jefferson Med. College, Phila.*
SOLOMON SOLIS COHEN, A.M., M.D., *Demonstrator of Pathology and Microscopy in the Philadelphia Polyclinic.*
P. S. CONNER, M.D., *Professor of Anatomy and Clinical Surgery in the Medical College of Ohio.*
LOUIS A. DUHRING, M.D., *Professor of Skin Diseases in the University of Penna.*
CHARLES W. DULLES, M.D., *Surgical Registrar, Hospital of the University of Penna.*
ROBERT FLETCHER, M.R.C.S.E., *of Washington, D. C.*
H. HORACE GRANT, M.D., *Lecturer on Operative and Minor Surgery in the Kentucky School of Medicine.*
PAUL GROSSMANN, M.D., *of Omaha, Nebraska.*
GEORGE C. HARLAN, M.D., *Surgeon to the Wills [Ophthalmic] Hospital, Phila.*
ROBERT P. HARRIS, M.D., *of Philadelphia, Pa.*
H. LAWRENCE JENCKES, M.D., *of Glen Haven, Wis.*
GEORGE WOODRUFF JOHNSTON, A.M., M.D., *Senior Assistant House Surgeon in the Woman's Hospital, New York City.*
W. W. KEEN, M.D., *Prof. of Surgery in the Woman's Medical College of Philada.*
JOHN A. LIDELL, A.M., M.D., *of New York.*
JOHN N. MACKENZIE, M.D., *Surgeon to the Baltimore Eye, Ear, and Throat Charity Hospital.*
READ J. McKAY, M.D., *of Wilmington, Del.*
J. EWING MEARS, M.D., *Demonstrator of Surgery in Jefferson Medical College, Phila.*
WALTER MENDELSON, M.D., *of New York.*
MIDDLETON MICHEL, M.D., *Professor of Physiology in the Medical College of South Carolina, Charleston, S. C.*
CHARLES K. MILLS, M.D., *Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic.*
JAMES L. MINOR, M.D., *Asst. Surgeon to the New York Eye and Ear Infirmary.*
S. WEIR MITCHELL, M.D., *Physician to the Infirmary for Nervous Diseases, Phila.*
ROBERT B. MORISON, M.D., *of Baltimore, Md.*
WILLIAM P. NORTHRUP, M.D., *Pathologist to the New York Foundling Asylum.*
WILLIAM OSLER, M.D., *Professor of Institutes of Medicine in McGill Univ., Montreal.*
J. C. REEVE, M.D., *of Dayton, Ohio.*
JOSEPH P. REMINGTON, PH.G., *Professor of the Theory and Practice of Pharmacy in the Philadelphia College of Pharmacy.*
JOS. G. RICHARDSON, M.D., *Professor of Hygiene in the University of Pennsylvania.*
ROBERT PATERSON ROBINS, M.D., *of Philadelphia.*
W. S. W. RUSCHENBERGER, M.D., *Surgeon U. S. Navy.*
CHARLES SMART, M.D., *Surgeon U. S. Army.*
JAMES TYSON, M.D., *Professor of General Pathology in the University of Pennsylvania.*
ARTHUR VAN HARLINGEN, M.D., *Professor of Skin Diseases in the Philadelphia Polyclinic.*
H. R. WHARTON, M.D., *Demonstrator of Clinical Surgery in the University of Penna.*
JAMES C. WHITE, M.D., *Professor of Dermatology in Harvard University.*
HIRAM WOODS, M.D., *House Physician of Bay View Asylum, Baltimore.*

TO READERS AND CORRESPONDENTS.

All communications intended for insertion in the Original Department of this Journal are only received for consideration with the distinct understanding that they are sent for publication to this Journal alone, and that abstracts of them shall only appear elsewhere subsequently, and with due credit. Gentlemen favouring us with their communications are considered to be bound in honour to a strict observance of this understanding.

Contributors who wish their articles to appear in the next number are requested to forward them before the 1st of November.

Liberal compensation is made for all articles used. Extra copies, in pamphlet form with cover, will be furnished to authors in lieu of compensation, *provided the request for them be made at the time the communication is sent* to the Editor.

The following works have been received for review:—

Zur Entstehung und Behandlung der Scrophulose und der Scrophulösen Erkrankungen der Sinnorgane. Von Dr. O. Paulsen, von Hamburg. Berlin, 1883.

Quelques reflexions sur la Lithotritie Rapide, practiquée suivant la methode du Dr. Bigelow. Par le Dr. Delefosse, etc. Paris, 1883.

Suture de la Vessie, pour une très grande plaie intra et extra Péritonéale. Réparation en deux actes opératoires éloignés, Guérison. Par le Dr. S. Possi. Paris, 1883.

De l'Excision du Goître Parenchymateux. Par le Dr. Liebrecht, Assistant à l'Université de Liege. Bruxelles, 1883.

L'Ospedale delle Donne e dei Bambini; Relazioni del Dott. G. Berruti et dele' Tug. O. Ballati. Torino, 1883.

Zur Lehre von der Lokalisation der Gehirnfunctionen. Von Prof. Dr. Moritz Benedikt. Wien, 1883.

De l'Urine dans l'Hématurie des Vaches. Par le Dr. Albert Robin. Paris, 1878.

Zur Physiologie de Gehörschnecke. Von Dr. B. Baginsky. Sitzungsberichte du k. k. Akad. du Wissenschaften zu Berlin, 1883.

De la Production du Phenol dans l'Organisme, considerée au point de vue physiologique et clinique. Par le Dr. Albert Robin, etc. Paris, 1883.

Note sur une Cause de la Lithiase urique et oxalique chez les enfants du premier age. Diagnostic et Traitement. Par le Dr. Albert Robin. Paris, 1883.

Guy's Hospital Reports. Edited by H. G. Howse, M.S., and Frederick Taylor, M.D. Vol. XLI. London: J. & A. Churchill, 1883.

Hospitals, Infirmaries, and Dispensaries: Their Construction, Interior Arrangement, and Management. With seventy-four illustrations. By F. Oppert, M.D., M.R.C.P.I. Second (English) edition, revised and enlarged. London: J. & A. Churchill, 1883.

The Pharmacopœia of the North-Eastern Hospital for Children. As compiled by a Committee of the Staff. London: J. & A. Churchill, 1883.

Some Recent Advances in the Surgery of the Urinary Organs. By Reginald Harrison, F.R.C.S., etc. London: J. & A. Churchill, 1883, pp. 30.

Lead Poisoning. By Thomas Stevenson, M.D.

Poisoning by Aconite (case of Reg. *v.* Lamson). By Thomas Stevenson, M.D.

The Causation of Sleep. By James Cappie, M.D. Second edition. Edinburgh: James Thin, 1882.

A Treatise on Diseases of the Eye. By J. Soelsberg Wells, F.R.C.S., Professor of Ophthalmology in King's College, etc. Fourth American from the third English edition, with copious additions. By Charles Steadman Bull, A.M., M.D., etc. Philadelphia: Henry C. Lea's Son & Co., 1883.

Anatomy, Descriptive and Surgical. By Henry Gray, F.R.S., F.R.C.S, etc. etc. With an Introduction on General Anatomy and Development. By Timothy Holmes, M.A., Cantab., etc. etc. Edited by T. Pickering Pick, Surgeon to St. George's Hospital, etc. A new American from the tenth English edition. To which is added Landmarks, Medical and Surgical. By Luther Holden, F.R.C.S. With additions. By W. W. Keen, M.D. Philadelphia: Henry C. Lea's Son & Co., 1883.

Elements of Histology. By E. Klein, M.D., F.R.S., etc. Philadelphia: Henry C. Lea's Son & Co., 1883.

The Treatment of Wounds and Fractures: Clinical Lectures. By Sampson Gamgee, F.R.S.E., etc. Second edition. Philadelphia: P. Blakiston, Son & Co., 1883.

Practical Histology and Pathology. By Henneage Gibbes, M.D., etc. Second edition. Philadelphia: P. Blakiston, Son & Co., 1883.

A Pocket-Book of Physical Diagnosis of the Diseases of the Heart and Lungs. By Dr. Edward T. Bruen, one of the Physicians to the Philadelphia Hospital, etc. Philadelphia: P. Blakiston, Son & Co., 1883.

Enteric Fever: Its Prevalence and Modifications; Etiology, Pathology, and Treatment, as illustrated by Army Data at Home and Abroad. By FRANCIS H. WELCH, F.R.C.S., Surgeon-Major, A.M.D. Philadelphia: P. Blakiston, Son & Co., 1883.

The Principles and Practice of Surgery. Being a Treatise on Surgical Diseases and Injuries. By D. HAYES AGNEW, M.D., LL.D., Professor of Surgery in the University of Pennsylvania. Vol. III. Philadelphia: J. B. Lippincott & Co. 1883.

The Roller Bandage. By WM. BARTON HOPKINS, M.D., etc. With seventy-three illustrations. Philadelphia: J. B. Lippincott & Co., 1883.

Hand-book of Electro-therapeutics. By Dr. WILHELM ERB, Prof. in University of Leipzig. Translated by L. PUTZEL, M.D. New York: Wm. Wood & Co., 1883.

Text-Book of Pathological Anatomy and Pathogenesis. By ERNST ZEIGLER, Professor of Pathological Anatomy in the University of Tübingen. Translated by DONALD MACALISTER, M.A., M.B., etc. New York, 1883.

Types of Insanity. An Illustrated Guide in the Physical Diagnosis of Mental Diseases. By ALLAN MCLANE HAMILTON, M.D., etc. New York: Wm. Wood & Co., 1883.

The Treatment of Wounds: Its Principles and Practice, General and Special. By LEWIS S. PILCHER, A.M., M.D., etc. New York: Wm. Wood & Co., 1883.

A Practical Treatise on the Medical and Surgical Uses of Electricity. By GEORGE M. BEARD, A.M., M.D., etc. etc., and A. D. ROCKWELL, A.M., M.D., etc. etc. Fourth edition. New York: Wm. Wood & Co., 1883.

The Essentials of Bandaging, with Directions for Managing Fractures and Dislocations; for Administering Ether, Chloroform, and using other Surgical Apparatus. By BERKELY HILL, M.B. Lond., F.R.C.S., etc. Fifth edition. Revised and enlarged. New York: J. H. Vail & Co., 1883.

Photo-Micrographs, and how to make them. By GEORGE M. STERNBERG, M.D., F.R.M.S., etc. Boston: James R. Osgood & Co., 1883.

Excision of the Knee-Joint, with report of twenty-eight cases. By GEORGE EDGEWORTH FENWICK, M.D., C.M., etc. Montreal: Dawson Brothers, 1883.

History of Tuberculosis from the time of Sylvius to the present day. Being in part a translation, with notes and additions, from the German of Dr. ARNOLD SPINA, etc. etc. By ERIC E. SATTLER, M.D. Cincinnati: Robert Clarke & Co., 1883.

A New School Physiology. By RICHARD J. DUNGLISON, A.M., M.D., etc. 8vo. pp. 315. Philadelphia: Porter & Coates, 1883.

Hand-book for Hospitals, No. 32. State Charities Aid Association. New York: G. P. Putnam's Sons, 1883.

Lessons in Qualitative Chemical Analysis. By F. BEILSTEIN, Professor at the Imperial Institute of Technology of St. Petersburgh. Translated from the fifth edition, with copious additions, including lessons in organic and volumetric analysis. By CHARLES O. CURTMAN, M.D., Professor of Chemistry in the Missouri Medical College, and in the St. Louis College of Pharmacy. St. Louis, 1883.

Report on Diseases of Women from the First Congressional District. By R. J. NUNN, M.D. Savannah, Ga.

Deafness among School Children. By Dr. J. P. WORRELL.

Hydrops Chorii. By JOHN MORRIS, M.D., Baltimore.

The Operative Treatment of Hare-lip. By JAMES WHITSON, M.D., F.F.P. and S.G., F.R.M.S., etc.

A Tracheotomy Tube for Gradual Withdrawal, and Report of a Case in which it was used. By H. F. HENDRIX, M.D., of St. Louis.

A Case of Adeno-Sarcoma of Mamma; Removal of Growth; Recovery. By JAMES WHITSON, M.D., F.F.P., S.G., etc.

A Rectal Obturator. By DAVID PRINCE, M.D., of Jacksonville, Ill.

The Treatment of the various forms of Acne. By GEORGE H. ROHÉ, M.D., etc.

Hints on the Treatment of some Parasitic Skin Diseases. By GEORGE H. ROHÉ, M.D., etc., 1883.

Anatomy, Surgery, and Hygiene of the Rectum. By JOSEPH EASTMAN, M.D., etc.

A Peculiar Cutaneous Lesion (Ulcus Elevatum) occurring during the use of Bromide of Potassium. By E. C. SEGUIN, M.D. New York, 1883.

Myelitis following Acute Arsenical Poisoning (by Paris or Schweinfurth Green). By E. C. SEGUIN, M.D., etc.

Hysterical Convulsions and Hemianæsthesia in an Adult Male. Cure by Metallotherapy. Gold. By E. C. SEGUIN, M.D., etc.

A Contribution to the Treatment of Empyema. By A. T. CABOT, A.M., M.D., etc., of Boston.

Jequirity Ophthalmia. By S. POLLAK, M.D., of St. Louis.

The Bead Suture. A Modification of the Quilled Suture for Palatoplasty, and for other operations. By DAVID PRINCE, M.D., of Jacksonville, Ill.

Experimental Researches on the Tension of the Vocal Bands. By F. H. HOOPER, M.D., etc., Boston.

Pemphigus, and the Diseases liable to be mistaken for it. By GEORGE H. ROHÉ, M.D., etc., Baltimore.

Some Researches after Hæmoglobin. By ROBERT SAUNDERS HENRY, A.M., M.D., of Baltimore.

The Treatment of Retained Placenta after Abortion. By HIRAM VON SCHWERING, M.D., Fort Wayne, Ind.

Judicial Oaths and their Effect. Pp. 8. Philadelphia, 1883.

The Next Step for the Medical Profession of the United States. By D. B. ST. JOHN ROOSA, M.D., LL.D. New York, 1883.

Contribution to the Study of Neglected Lacerations of the Cervix Uteri and Perineum. By THOMAS A. ASHBY, M.D., etc. Baltimore, 1883.

Opinion as to the Legality of Quarantine Laws of Louisiana. By F. C. ZACHARIE, Attorney of Board of Health, State of Louisiana.

Report of Conference Committee of Louisiana Board of Health, relative to Proposition of New Orleans Auxiliary Association. Also report of Hon. F. C. ZACHARIE, Attorney, on Ordinance 216 Council Series.

Outline of the History and Practice of Quarantine, etc. By JOSEPH JONES, M.D., President of the State Board of Health. New Orleans, 1883.

Registration of Physicians of the State of Louisiana, under Act 31 of 1882. New Orleans, 1883.

The Topographical Relations of the Female Pelvic Organs. By AMBROSE L. RAMSEY, A.M., M.D., etc. With twenty-two wood-cuts. Pp. 121. New York: Wm. Wood & Co., 1883.

Extirpation of the Uterus. By PAOLO DE VECCHI, M.D., Torino, Italy. Also note on Extirpation of the Kidney. San Francisco, 1883.

Transactions of the Medical Society of North Carolina and North Carolina Board of Health. Concord, 1883.

Transactions of the Medical Society of West Virginia. Wheeling, 1883.

Transactions of the Mississippi State Medical Association. Meridian, April, 1883.

Transactions of the South Carolina Medical Association. Charleston, 1883.

Transactions of the College of Physicians of Philadelphia. Third series. Volume VI. Pp. 451. Philadelphia, 1883.

Transactions of the State Medical Society of Tennessee, 1883. Nashville, 1883.

Transactions of the Michigan State Medical Society for the year 1883. Lansing, 1883.

Medical Communications of the Massachusetts Medical Society. Vol. XIII., No. II. 1883. Boston, 1883.

Proceedings of the N. W. Provinces and Oudh Branch of the British Medical Association, April to July, 1883.

Minutes of the Twenty-eighth Annual Meeting of the Kentucky State Medical Society. Held at Louisville, April 4, 5, and 6, 1883.

Proceedings of the Medical Society of the County of Kings, New York. No. 7. 1883.

Proceedings of the Academy of Natural Sciences of Philadelphia. Part I. January to May, 1883. Philadelphia, 1883.

Sanitary and Statistical Report of the Surgeon-General of the Navy, for the year 1881.

First Report of the State Board of Health to his Excellency, Thomas J. Churchill, Governor of the State of Arkansas. From the organization, April 27, 1881, to December 1, 1882.

Report of the Proceedings of the Illinois State Board of Health. Quarterly meeting, Springfield, June 29, 1883.

Twenty-eighth Annual Report upon the Births, Marriages, and Deaths in the City of Providence, for the year 1882. By EDWIN M. SNOW, M.D., Superintendent of Health and City Registrar. Providence, 1883.

Fifth Annual Report of the State Board of Health of Rhode Island, for the year 1882. Providence, 1883.

First Annual Report of the State Board of Health of New Hampshire, for the year ending April 30, 1882. Concord, 1882.

Joint Annual Report of the Chamber of Commerce and Board of Trade of Minneapolis, Minnesota, 1882.

Report of the Commission de Lunatico Quirendo of Victor Eloi to the Hon. W. T. Houston, Judge Civil District, Section B. By Y. R. LE MONNIER, M.D., June, 1883. New Orleans.

Report of the Department of Health, City of Chicago, for 1881 and 1882.

Report of the Board of Health of the City of Boston, for 1882–1883. Boston, 1883.

Report of the Trustees of the City Hospital, Boston, etc., 1882–1883. Boston, 1883.

Report on Laceration of the Cervix Uteri. By T. B. HARVEY, M.D., etc., to the Indiana State Medical Society, May, 1883.

Sixth Annual Report of the Managers of the Adams Nervine Asylum. Boston, 1883.

Report of the Board of Health of the State of Louisiana to the General Assembly, for the year 1882, and the first six months of 1883. Embracing the Quarantine and Sanitary Operations of the Board of Health during a period of eighteen months, January 1, 1882, to July 1, 1883. Baton Rouge, 1883.

The following Journals have been received in exchange:—

Bibliothek for Læger. Nordiskt Medicinskt Arkiv. Upsala Läkareförenings Förhandlingar. Kronika Lekarska. Annali Universali di Medecina e Chirurgia. Gazzetta degli Ospitali. Giornale Italiano delle Malattie Veneree. El Ensayo Medico. L'Indipendente. L'Imparziale. Lo Sperimentale. O Correio Medico de Lisboa. Gazette Med. de l'Orient. Cronica Medico-Quirurgica de la Habana. União Medica. La Union Medica, Caracas. Allgemeine Wiener Medizinische Zeitung. Berliner Klinische Wochenschrift. Centralblatt für die Gesammte Therapie. Centralblatt für Chirurgie. Centralblatt für Gynäkologie. Centralblatt für Klinische Medicin. Centralblatt für die Medicinischen Wissenschaften. Deutsches Archiv für Klinische Medicin. Deutsche Medicinische Wochenschrift. Medicinisch Chirurgisch Centralblatt. Medizinische Jahrbücher. Wiener Med. Presse. Zeitschrift für Physiologische Chemie. Annales de Dermatologie et de Syphiligraphie. Annales de Gynécologie. Annales des Maladies de l'Oreille, du Larynx, et des Organes Annexes. Archives de Médicine et de Pharmacie Militaires. Archives de Neurologie. Archives Générales de Médecine. Bulletin Générale de Thérapeutique. Gazette Hebdomadaire. Gazette Médicale de Paris. Gazette Médicale de Nantes. Journal de Médecine de Paris. L'Abeille Médicale. L'Encéphale. Le Progrès Médicale. L'Union Médicale. Revue de Chirurgie. Revue de Médecine. Revue de Thérapeutique. Revue des Sciences Médicales. Revue Internationale des Sciences Biologiques. Revue Méd. Franç. et Etrangère. Revue Mensuelle de Laryngologie. Revue Scientifique. Brain. Braithwaite's Retrospect. Bristol Medico-Chirurgical Journal. British Medical Journal. Dublin Journal of Medical Science. Edinburgh Medical Journal. Glasgow Medical Journal. Journal of Anatomy and Physiology. Journal of Physiology. Journal of Psychological Medicine. Lancet. Liverpool Medico-Chirurgical Journal. London Medical Record. Medical Times and Gazette. Ophthalmic Review. Practitioner. Australian Medical Journal. Indian Medical Gazette.

American Psychological Journal. Archives of Laryngology. Atlanta Medical Register. Atlantic Journal of Medicine. Alienist and Neurologist. American Journal of Insanity. American Journal of Neurology and Psychiatry. American Journal of Obstetrics. American Journal of Otology. American Journal of Pharmacy. American Journal of Science. American Medical Digest. American Practitioner. Annals of Anatomy and Surgery. Archives of Medicine. Archives of Ophthalmology. Archives of Otology. Atlanta Medical and Surgical Journal. Boston Medical and Surgical Journal. Boston Journal of Chemistry. Buffalo Medical and Surgical Journal. Chicago Medical Journal and Examiner. Chicago Medical Review. Cincinnati Lancet and Clinic. Cincinnati Medical News. College and Clinical Record. Columbus Medical Journal. Denver Medical Times. Detroit Lancet. Detroit Clinic. Druggists' Circular. Ephemeris of Materia Medica. Gaillard's Medical Journal. Half-Yearly Compendium of Medical Science. Journal of Cutaneous and Venereal Diseases. Journal of Nervous and Mental Diseases. Journal of the American Medical Association. Kansas Medical Index. Louisville Medical News. Maryland Medical Journal. Medical Age. Medical Gazette. Medical Herald. Medical Annals. Michigan Medical News. Medical News. Medical and Surgical Reporter. Medical Record. Mississippi Valley Medical Monthly. Nashville Journal of Medicine and Surgery. New Orleans Medical and Surgical Journal. New Remedies. New York Medical Journal. North Carolina Medical Journal. Obstetric Gazette. Ohio Medical Journal. Pacific Medical and Surgical Journal. Pittsburg Medical Journal. Philadelphia Medical Times. Polyclinic. Rocky Mountain Medical Times. Physician and Surgeon. San Francisco Western Lancet. Sanitarian. St. Louis Clinical Record. St. Louis Courier of Medicine. St. Louis Medical and Surgical Journal. Therapeutic Gazette. Virginia Medical Monthly. Canadian Practitioner. Canada Lancet. Canada Medical Record. Canada Medical and Surgical Journal. L'Union Médicale du Canada. Medical Age. Sanitary Engineer. Sanitary News.

Communications intended for publication, and books for review, should be sent *free of expense*, directed to I. Minis Hays, M.D., Editor of the American Journal of the Medical Sciences, care of Henry C. Lea's Son & Co., Philadelphia. Parcels directed as above, and (carriage paid) under cover, to Messrs. Nimmo & Bain, Booksellers, No. 14 King William Street, Charing Cross, *London*, will reach us safely and without delay.

All remittances of money and letters on the *business* of the *Journal* should be addressed *exclusively* to the publishers, Henry C. Lea's Son & Co., No. 706 Sansom Street.

The advertisement sheet belongs to the business department of the *Journal*, and all communications for it must be made to the publishers.

CONTENTS

OF

THE AMERICAN JOURNAL

OF

THE MEDICAL SCIENCES.

NO. CLXXII. NEW SERIES.

OCTOBER, 1883.

ORIGINAL COMMUNICATIONS.

MEMOIRS AND CASES.

ART. PAGE

I. On certain Abscesses of the Neck which may Cause Sudden Death, and how to Treat them with Success. By John A. Lidell, A.M., M.D., of New York, late Surgeon to Bellevue Hospital, etc. 321

II. A Contribution to the General Knowledge concerning the Prurigo Papule. By Robert B. Morison, M.D., of Baltimore 341

III. Excision of the Tarsus, with a Report of Two Successful Removals of the Entire Tarsus. By P. S. Conner, M.D., Prof. of Anatomy and Clinical Surgery, Medical College of Ohio, etc. 362

IV. On the Renal Circulation during Fever. An Experimental Research made at the Pathological Institute of the University of Leipzig. To which was awarded the Cartwright Prize Essay for 1883. By Walter Mendelson, M.D., of New York 380

V. Calculous and other Affections of the Pancreatic Ducts. By George Woodruff Johnston, A.M., M.D., Senior Assistant House Surgeon in the Woman's Hospital, New York City; late House Surgeon in the Hospital of the University of Pennsylvania, Philadelphia . . . 404

VI. Classification of the "Porro (?) Operations." What is a True Porro-Cæsarean Operation, and what other Forms of Uterine Ablation in Pregnant Women have been erroneously called "Porro," and should be separately classified. By Robert P. Harris, A.M., M.D., of Philadelphia 430

VII. Ligation of the Subclavian Artery between the Scaleni for Hemorrhage from a Gunshot Wound. Recovery. By Middleton Michel, M.D., Professor in the Medical College of the State of South Carolina, Charleston, S. C. 439

VIII. Galvano-Puncture for the Cure of Aneurism. By T. R. Chambers, M.D., of East Orange, N. J. 447

ART. PAGE

IX. Closure of the Jaws and its Treatment, with the report of a case in which complete occlusion followed a Gunshot Wound of the Left Superior Maxilla, received at two and a half years of age, and which was relieved eighteen years subsequently by operation according to a new method. By J. Ewing Mears, M.D., Professor of Anatomy and Clinical Surgery in the Pennsylvania College of Dental Surgery, Demonstrator of Surgery in Jefferson Medical College, etc. 454

X. Report of a Case of Abscess of the Left Iliac Fossa, with some Remarks. By Louis W. Atlee, M.D., of Philadelphia 463

XI. Clinical Observations upon Otorrhœa (Chronic Purulent Otitis Media), with Perforations of the Membrana Tympani. By Read J. McKay, M.D., of Wilmington, Delaware, Member of the American Otological Society 468

XII. A Modified Porro-Cæsarean Operation: The Pedicle Dropped in. By Paul Grossmann, M.D., of Omaha, Nebraska 477

XIII. Experiments in the Use of Naphtol for the Treatment of Skin Diseases. By Arthur Van Harlingen, M.D., Professor of Skin Diseases in the Philadelphia Polyclinic 479

XIV. Periostitis of the Mastoid; Necrosis; Recovery. By Wm. S. Cheesman, M.D., of Auburn, New York 490

REVIEWS.

XV. Spinal Concussion.

Injuries of the Spine and Spinal Cord without Apparent Mechanical Lesion and Nervous Shock, in their Surgical and Medico-Legal Aspects. By Herbert W. Page, M.A., M.C. Cantab., Fellow of the Royal College of Surgeons of England, etc. Philadelphia: P. Blakiston, Son & Co., 1883 493

XVI. Saint Thomas's Hospital Reports. New Series. Edited by Dr. Robert Corey and Mr. Francis Mason. Vol. XI. 8vo. pp. xvi., 419. London: J. & A. Churchill, 1882 503

XVII. Guy's Hospital Reports. Edited by H. G. Howse, M.S., and Frederick Taylor, M.D. Vol. XLI., pp. 515. London: J. & A. Churchill, 1883 512

XVIII. Sanitary and Statistical Report of the Surgeon-General of the Navy for the year 1881. 8vo. pp. 684. Government Printing Office, Washington, D. C., 1883 517

XIX. A Treatise on Insanity in its Medical Relations. By William A. Hammond, M.D., Surgeon-General United States Army (Retired List); Professor of Diseases of the Mind and Nervous System in the New York Post-Graduate Medical School; President of the American Neurological Association, etc. 8vo., 767 pages. New York: D. Appleton & Co., 1883 521

ART. PAGE

XX. Chirurgie Orthopédique. Thérapeutique des Difformités congénitales ou acquisés. Par le Dr. L. A. Saint-Germain, Chirurgien de l'Hôpital des Enfants-malades. 8vo. pp. 7, 651. Avec figures. Paris: J. B. Ballière et Fils, 1883.

Orthopaedic Surgery. Treatment of Congenital and Acquired Deformities. By Dr. L. A. Saint-Germain, etc. 525

XXI. A Text-book of Pathological Anatomy and Pathogenesis. By Ernst Ziegler, Prof. of Pathological Anatomy in the University of Tübingen. Translated and edited for English students by Donald MacAlister, M.A., M.B., Member of the Royal College of Physicians, Fellow and Medical Lecturer of St. John's College, Cambridge. Part I. General Pathological Anatomy, pp. 360, figs. 117. London: Macmillan & Co., 1883 . 527

XXII. The Transactions of The Medico-Chirurgical Society of Edinburgh. Vol. I. Session 1881–2. 8vo. pp. 188. Oliver and Boyd, Publishers to the Society, Edinburgh, 1882 529

XXIII. A History of Tuberculosis from the time of Sylvius to the present day, being in part a translation, with Notes and Additions, from the German of Dr. Arnold Spina; containing also an Account of the Researches and Discoveries of Dr. Robert Koch and other recent Investigators. By Eric E. Sattler, M.D. 12mo. pp. 191. Cincinnati: Robert Clarke & Co., 1883 530

XXIV. Disease Germs.

1. The Bacteria. By Dr. Antoine Magnin, Licentiate of Natural Sciences, Chief of the Practical Labours in Natural History to the Faculty of Medicine of Lyons, etc. Translated by George M. Sternberg, M.D., Surgeon U. S. Army. 8vo. pp. 227. Boston: Little, Brown & Co., 1880.

2. Bacteria: the smallest Living Organisms. By Dr. Ferdinand Cohn. Translated by Dr. Charles S. Dolley. Pamphlet. pp. 30. Rochester, N. Y.

3. Bacteria and the Germ Theory of Disease; Eight Lectures delivered at the Chicago Medical College. By Dr. H. Gradle, Prof. of Physiology, Chicago Medical College. 8vo. pp. 249. Chicago: W. T. Keener, 1883.

4. On the Relations of Micro-Organisms to Disease. The Cartwright Lectures delivered before the Alumni Association of the College of Physicians and Surgeons, New York. By William T. Belfield, M.D., Lecturer on Pathology and on Genito-Urinary Diseases, Rush Medical College, Chicago. 16mo. pp. 131. Chicago: W. T. Keener, 1883 531

XXV. De l'Excision du Goître Parenchymateux. Par Le docteur Paul Liebrecht, Assistant à l'Université de Liège. Ext. du Bulletin de l'Académie Royale de Médecine de Belgique: 3e Sér., t. xviii., No. 3. 8vo. pp. 270. Bruxelles: H. Manceaux, 1883.

The Excision of Parenchymatous Goitre. By Dr. Paul Liebrecht, etc. . 532

ART. PAGE

XXVI. Health Reports.

1. First Annual Report of the Board of Health of the State of New Hampshire for the year ending April 30, 1882. Concord, 1882, pp. 318.

2. Fifth Annual Report of the Board of Health of the State of Rhode Island for 1882. Providence, 1883. Pamphlet, pp. 327.

3. First Report of the State Board of Health of Arkansas from April, 1881, to December, 1882. Little Rock, 1883. Pamphlet, pp. 181 535

XXVII. Excision of the Knee-Joint, with Report of twenty-eight Cases. Illustrated by thirteen Photo-Lithographs and Wood Engravings. By George Edgeworth Fenwick, M.D., C.M., etc. 8vo. pp. 68. Montreal: Dawson Bros., 1883 539

XXVIII. Types of Insanity: An Illustrated Guide in the Physical Diagnosis of Mental Disease. By Allan McLane Hamilton, M.D., one of the Consulting Physicians to the Insane Hospitals of New York City, etc. New York: William Wood & Co., 1883 540

XXIX. On the Treatment of Wounds and Fractures; Clinical Lectures. By Sampson Gamgee, F.R.S.E., etc. Second edition, 8vo., pp. ix., 364. With 44 engravings on wood. Philadelphia: P. Blakiston, Son & Co., 1883 540

XXX. Handbook of Electro-Therapeutics. By Dr. Wilhelm Erb, Professor in the University of Leipzig. Translated by L. Putzel, M.D. With thirty-nine wood-cuts. 8vo. 366 pages. New York: Wm. Wood & Co., 1883 545

XXXI. Observations on Lithotomy, Lithotrity, and the early Detection of Stone in the Bladder; with a Description of a New Method of Tapping the Bladder. By Reginald Harrison, F.R.C.S., etc. 8vo. pp. 71. London: J. & A. Churchill, 1883 545

XXXII. Anatomy, Descriptive and Surgical. By Henry Gray, F.R.S., with the collaboration of T. Holmes, M.A., H. V. Carter, M.D., and T. Pickering Pick. A new American, from the tenth English edition, to which is added Landmarks, Medical and Surgical, by Luther Holden, F.R.C.S., with additions by W. W. Keen, M.D., 8vo. pp. xxxii., 1023. Philadelphia: Henry C. Lea's Son & Co., 1883 546

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES IN THE MEDICAL SCIENCES.

Anatomy and Physiology.

	PAGE
Primary Radicles of the Lymphatic System. By M. Sappey	547
A New Centre of Vision in the Human Eye. By M. Delbœuf	548
Kymographic Measurements in Men. By Prof. E. Albert	549
Physiology of the Bladder and Rectum. By Mr. F. Le Gros Clark	550

Materia Medica and Therapeutics.

Physiological Action of Barium Chloride. By Drs. Sidney Ringer and Harrington Sainsbury	550
Action of Saline Cathartics. By Mr. Matthew Hay	551
Action of Piperidin. By Fliess	553
Iodoform. By Dr. Hofmakl	554
Anæsthetic Action of a Mixture of Air and Chloroform. By M. Paul Bert	555
Value of Hyoscyamine in Psychiatric Practice. By M. Gnauk	556
Acetal and Paraldehyde; their Hypnotic and Analgesic Properties. By von Mering	556
Resorcin in Hyperpyrexia, Intermittent Fever, Anthrax, and Erysipelas	558

Medicine.

Hæmoglobinæmia. By Prof. Ponfick	559
Renal Form of Typhoid Fever. By Dr. Didion	560
Treatment of Cholera. By Dr. B. Ward Richardson	561
Diabetes in Children. By Dr. Senator	561
Melituria after Scarlatina. By Dr. Zinn	562
Acetonuria and Diabetic Coma. By S. Mackenzie	563
Resorcin in Whooping-Cough. By Dr. Moncorvo	564
Pathology of Bronchial Asthma. By Prof. Riegel	565
Fatty Transformation of the Kidney. By Mr. Edwin Rickards	567
Adenoma of the Kidney. By Drs. A. Weichselbaum and Robert W. Greenish	568
The Nature of the Albuminuria of Bright's Disease. By Dr. Semmola	570
Relation between Serum-Albumen and Globulin in Albuminuria. By Prof. F. A. Hoffman	572
Hæmato-Chyluria and Chyluria. By Wucherer	573
Treatment of Leprosy. By Surgeon-Major Peters	574
Value of Arsenic in Certain Forms of Anæmia. By Dr. F. W. Warfvinge	576

Surgery.

PAGE

Operative Procedures in Diseases of the Lungs. By Dr. Bull . 578
Ulcer of the Duodenum. By Dr. Chvostek 579
Resection of the Intestine. By MM. G. Bouilly and G. Assaky 583
Resection of the Intestine. By Dr. Teresino Prati . . . 584
Inguino-properitoneal Hernia. By Dr. Max Oberst . . . 584
Removal of Large Renal Tumour by Abdominal Section. By Dr. Henry G. Rawdon . . . 585

Ophthalmology and Otology.

Dilute Solutions of Eserine in Weakness of the Ciliary Muscle. By Dr. John C. Uhthoff . . 586
Trephining the Pyramid of the Petrous Bone. By Gluck . 587

Midwifery and Gynæcology.

Extra-uterine Pregnancy. By Prof. A. I. Krassowski . . 588
Metria. By Drs. Lombe Atthill, Thomas Moore Madden, Alexander, Wynn Williams, A. D. Macdonald, Edis, and Graily Hewitt 588
Dysmenorrhœa. By Dr. Vedeler 594
Pathology and Treatment of Uterine Myoma. By Mr. Lawson Tait and Drs. Herman, Dewar, and Meadows 596
Accumulations of Pus in the Uterus. By Prof. N. F. Tolochinoff 597
Puerperal Inversion of the Uterus. By Prof. Braun . . . 598

Medical Jurisprudence and Toxicology.

Diffusion of Arsenic through the Body when thrown into the Mouth and Rectum after Death. By Prof. Prescott and Drs. Vaughan and Dawson . 599

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR OCTOBER 1883.

Article I.

On certain Abscesses of the Neck which may Cause Sudden Death, and how to Treat them with Success. By John A. Lidell, A.M., M.D., of New York, late Surgeon to Bellevue Hospital, etc.

Many years ago, an example of very sudden death, which resulted from a small and seemingly a circumscribed abscess of the connective tissue that had been rather rapidly developed underneath the left sterno-cleido-mastoid muscle, came under my notice and impressed me so strongly at the time, that its remembrance has never become effaced, nor even much impaired. This example I have long intended to record in a permanent form, but circumstances, which it is now unnecessary to mention, have hitherto prevented. However, I shall proceed without any further delay to execute this ancient purpose.

My attention was first called to the case on Sunday morning, July 24, 1864, at the usual weekly inspection of Stanton Military Hospital (which was then under my charge), by Dr. John B. Garland, Acting Assistant Surgeon U. S. Army, who had the immediate care of the young man who was the patient. He was sitting in a chair at the time, beside the head of his bed, in Ward No. 5; but, when I approached him, he immediately arose and gave the usual military salute, without showing any sign of physical weakness. His countenance was rather pale; but it did not appear to be emaciated, nor indicative of any particular suffering or disease. There was, however, a tumefaction plainly visible on the left side of his throat, first noticed only three days before, that was increasing steadily and rather rapidly, which made Dr. Garland somewhat anxious about the case, and desirous of my advice, especially in regard to the nature or diag-

nosis of the tumefaction itself. His neck was stiff, and his head twisted somewhat toward the opposite side. Proceeding now to examine the patient manually (chirurgically), I found on the left front of his neck, at the level of the pomum Adami, a pretty firm and well-rounded, but not movable swelling, about the size of a small lemon, which was deeply seated, being apparently in or near the track of the great cervical bloodvessels and pneumogastric nerve of that side, and obviously covered by the sterno-cleido-mastoid muscle, as well as by the common integument, etc. It exhibited an obscure deeply-seated fluctuation, but was entirely destitute of pulsation; it also exhibited some tenderness (soreness) under pressure.

As to the young man's previous history, I was briefly informed that he had been admitted into the hospital somewhat over two months previously for a gonorrhœa, which had readily yielded to the treatment employed; that, while waiting in the hospital to regain his strength, he had been attacked with cynanche tonsillaris and malarial fever, which proved rather obstinate, but finally they were overcome; and that, while he was convalescing from these disorders, diarrhœa supervened, and was followed by the tumefaction mentioned above, which first presented itself, in company with some soreness and stiffness of the affected parts, three days before, as already stated. I was also informed that there had not been any cutaneous eruption in the history of the case, nor any osteocopes, nor any enlargement of the lymphatic ganglia in the neck, groins, elbows, or any other part, although it had been repeatedly and carefully sought for. There certainly was no sign of syphilis discernible when I saw him. Finally, I concluded that the swelling on the left front of his neck was an abscess formed in the deep connective tissue of his neck, and firmly bound down by the reduplications of the deep cervical fascia, which should be promptly opened and evacuated by making an external incision; but, as there was not much dysphagia, and no dyspnœa whatever, as well as not even the slightest symptom apparent indicating any urgency for the immediate employment of this procedure, and, moreover, being myself much pressed for time by reason of the inspection then in hand, I unwittingly postponed the operation of incising it until the following morning. Indeed, the patient expressed himself in reply to my inquiry as feeling quite comfortable; and certainly there was nothing whatever to be seen among the objective signs which could lead one to suspect that a fatal issue of the case might be very close at hand. That evening, however, I was surprised and shocked on learning that the patient had suddenly expired in the afternoon, from asphyxia caused by a tight closure of the rima glottidis, without the appearance of any warning symptoms, and before the officer of the day could be brought to him.

With good reason, then, Dr. Garland had exhibited unusual anxiety concerning his patient's welfare; not only because, as he said, the man had been in the hospital somewhat over two months, firstly for gonorrhœa,

next for tonsillitis, ulcerated sore-throat, and malarial fever, then for diarrhœa, and finally a deep-seated abscess in the neck had suddenly supervened, but likewise because of the unexpected consequences of this abscess.

This case was so tragic and surprising in its issue, as well as so widely different from the general run of abscesses, and likewise presented so many features worthy of special mention, that I requested Dr. G. to furnish me with all the particulars, as far as possible, which would serve to throw any light upon it, and with this request he promptly complied. I herewith present his report of the case unabridged, lest by condensing his account thereof, I should in any respect impair its value for future investigators, or weaken the lessons which it obviously inculcates.

CASE I.—Private Albert J., aged 18 years, belonging to the Signal Corps, was admitted into Stanton Hospital May 21, 1864, with gonorrhœa; health otherwise apparently good; he had neither sores nor swellings on any part of his person.

May 22. Ordered magnesia sulphat. ℥j; to be followed by the following mixture:—

℞.—Copaibæ balsami,
Spt. æther. nitros., ää ℥j.
Liquoris potassæ, ℥ij.
Spt. lavendulæ comp. ℥ij.
Syrupi acaciæ, ℥vj.—M.

Sig. One tablespoonful three times per day; wash frequently the parts in cold water; low diet, and rest in bed.

28*th*. Renew the gonorrhœa mixture; also ℞. Zinci sulphat. gr. viij, aquæ ℥iv. M. S. Use this as an injection twice or three times per day. The discharge has ceased, but medication is to be continued for better security.

June 2. He has been ordered to do duty in the hospital wards, etc. Considering the patient as cured, and not hearing anything further from him, I lost sight of him from this time, and until I again found him in bed, on June 22, complaining of a sore throat. Upon examination, I found him free from gonorrhœa and with nothing to indicate a syphilitic taint. He is perfectly free from sores and swellings of every kind, whether glandular or otherwise, except a general inflamed condition of the fauces, tonsils, etc.; has cough, fever, and some difficulty of respiration; has had a chill; complains of no pain. ℞. Quiniæ sulph. gr. vj, three times per day; a Seidlitz powder every hour until it operates freely; apply ice to throat; and use for a gargle, ℞. Argent. nitrat. gr. viij, aquæ ℥iij, syrupi simplicis ℥j, M., three times per day.

23*d*. Continue the quinine and gargle, with ice to throat.

24*th*. General condition better; chills have stopped; throat, however, continues sore; cough, supposed to result from faucial irritation, still troublesome. Continue quinine and the gargle, with ice to throat.

25*th*. Treatment to be continued unchanged.

26*th*. The left tonsil has become ulcerated. Excepting difficulty of deglutition, the patient appears to be a little better. He says he would eat if he could swallow. Touched the tonsillar ulcers with caustic (argenti nitras); ordered ℞. Potassæ chlorat. ℥ss, syrupi simplicis ℥j, aquæ ℥iij. M. Ft. gargarisma. To be used three or four times per day. Also, magnesia sulphat. ℥ss, to be repeated if the bowels do not move in three

hours. His food to consist of animal broths or soups, milk, soft-boiled eggs, custards, or any nourishing fluid food he will or can swallow.

July 1*st*. The patient's general condition is fair, with the exception of sloughing about the tonsils and parts adjacent thereto. ℞. Potass. nitrat. ℥ss; ol. olivæ, ℥ij; sacchari albi, ℥j. M. Tere in mortario. Ordered the ulcerated throat to be mopped with this mixture; also the chlorate of potassa gargle, and the special diet to be continued.

6*th*. Patient decidedly better; faucial ulcers nearly all healed, and he has more appetite; same treatment to be continued.

10*th*. Patient not so well; he complains of heat and pain in the region of the larynx, but the ulcers have healed over as far down as can be seen. Ordered six dry cups to be put upon the upper part of his chest, to be followed by a sinapism on his breast.

11*th*. Patient entirely relieved of his pain and difficulty of breathing by the cups and mustard plaster, and he is doing well.

17*th*. He has some diarrhœa. ℞. Mistura contra diarrhœam hospitalis. *Signa*. Take one teaspoonful after each stool.

18*th*. The diarrhœa is checked, and he feels tolerably well.

20*th*. Bowels again loose, but it does not amount to diarrhœa. Ordered the diarrhœa mixture to be repeated.

21*st*. All medicine was stopped, and a full diet of whatever he could swallow allowed.

23*d*. Patient appears to be doing well generally, but he complains of a feeling of soreness in the left side of his throat, which is also slightly swollen. Ordered the painful and swollen part of his throat to be painted with tincture of iodine, and as nourishing a diet as he could swallow to be continued.

24*th*. Says he feels better; same treatment continued. But he died suddenly in the afternoon of this day from asphyxia, caused by spasm of the glottis.

Autopsy, twenty-four hours after death.—The ulceration of the fauces had entirely healed. There was some extra redness of the larynx. But just beneath the left sterno-cleido-mastoid muscle, in a line with the thyroid cartilage, there was an abscess about the size of an egg, filled with a thick, yellow pus, which had burrowed down to about 1½ inches below the omo-hyoid muscle.

There was also extensive hepatization of the lower lobe of left lung, and middle lobe of right lung. The rest of the viscera, as far as examined, were normal.

Comments.—Was the "sore throat" which attacked this young man, some five or six weeks after he had become affected with gonorrhœa, in reality a manifestation of constitutional or secondary syphilis, or not? This question, which obviously possesses very great practical importance, however, cannot be answered with absolute certainty; but, at the same time, it appears highly probable that syphilis had no part in producing it, *firstly*, because the clinical history shows a complete freedom from syphilitic disease of the skin, lymphatic glands, eyes, bones, muscles, etc.; and, *secondly*, had the affection of the throat been caused by constitutional syphilis, recovery therefrom would not have followed so readily as it did, under the plan of treatment detailed above.

The autopsy showed that abscess underneath the left sterno-cleido-mastoid muscle was developed in the connective tissue, and not from a lymphatic gland. The autopsy also showed that the abscess, which had appeared to be circumscribed when examined externally during life, was in reality attended with an extensive burrowing of purulent matter in the connective tissue adjoining it, especially in a downward direction, and "to about one-and-a-half inches below the omo-hyoid muscle," as stated above. And it is highly probable that the motor nerves of the laryngeal muscles, *i. e.*, the recurrent laryngeal nerves, had been invaded or irritated by this diffusion of purulent matter in the loose connective tissue, or the inflammatory process which attended it, in such a manner or to such a degree as to suddenly cause a spasmodic closure of the glottis, and almost instant death from asphyxia. It is also quite possible that I had myself unwittingly aided to hasten the occurrence of this unhappy termination of the case, by applying that very moderate degree of pressure to the swelling, which it was necessary to use in order to determine the nature thereof, for such an application of force would manifestly promote in a corresponding degree the purulent diffusion just described. I make particular mention of this point, because the calamitous result of this case clearly shows that, whenever the surgeon has to examine cervical abscesses of a similar character, he must always be prepared to lay them open and discharge their contents on the spot, whether any symptoms of impending suffocation be already present or not.

To what should the so-called hepatization of the lower lobe of the left lung and middle lobe of the right, which was noted at the autopsy, be ascribed? The clinical history of the patient does not warrant a belief that it was due to an inflammatory process, *i. e.*, to double pneumonia. It is much more likely that this apparent solidification of the pulmonary tissue resulted from the mode of death; possibly it was caused by an obstruction of the corresponding branches of the pulmonary artery with blood-clots (emboli), detached from the right chambers of the heart by violent struggles for breath during the last moments of life.

Functional disturbance of the recurrent laryngeal nerves to such an extent as to seriously impair the action of the laryngeal muscles, and arising from purely surgical affections, is by no means a novelty in surgical literature, for it has likewise been observed in many analogous instances. For example, the sagacious Hennen (*Principles of Military Surgery*, pp. 286–289, Am. ed.) has reported, with his customary exactness, the case of his friend, Lieutenant-Colonel A. C., a British officer, who was wounded at Waterloo by a musket-ball, at short range, which entered his neck about one inch above the level of his left clavicle, passed backward through the sternal portion of the left sterno-cleido-mastoid muscle, "and inward toward the thorax; but no further trace of its route could be discovered." It was followed by a great loss of blood, which

ceased spontaneously. Very grave symptoms ensued, but it is unnecessary to detail them here. On the fourth day, however, "a new symptom was superadded; his voice, which we had directed him not to employ except on the most urgent occasions, was now lost altogether, and when addressed he pointed constantly to the course of the recurrent nerves, so as to convince us that an affection of them was the cause of this privation." In this case these nerves were doubtless affected by the inflammatory swelling with which holes when bored into the flesh by musket-balls are usually attended; for, when this swelling subsided, his voice returned, and in the end he appears to have entirely recovered from his wound.

But to return to the consideration of our own case: The autopsy showed that the cervical abscess which had produced such dire consequences did not arise from cervical adenitis, but from an inflammatory disorder of the connective tissue, as already intimated above. Now to what course should this disorder of the connective tissue, *i. e.*, the abscess itself, be attributed? It is quite possible that "hospitalism," or blood-poisoning of a peculiar nature, caused by the prolonged breathing of an atmosphere which had become infected in a peculiar manner, performed an important part in its production; for, at this time, the wards of Stanton Hospital were strongly infected with the *contagium* of pyæmia, in consequence of a deplorable mistake in the original construction of the hospital itself—a mistake which consisted in constructing the inner walls of these wards of strong, thick, buff-coloured paper, a substance highly absorbent and retentive of putrefactive gases, instead of hard-finished plastering, which is comparatively a non-absorbent substance (but I should here state that soon afterwards this sad mistake was rectified, by tearing out the paper walls and putting in others made of laths and plastering, as ought to have been done at the outset). This view as to the influence which "hospitalism" may possibly have exerted in the production of this abscess, is favoured by the fact that, although it grew rapidly, it was not attended by the violent symptoms, *e. g.*, the heat, the redness, the painfulness, and the excessive tenderness which characterize the formation of an acute or phlegmonous abscess in this part, but rather by the local phenomena, both subjective and objective, which often attend the formation of so-called secondary or metastatic abscesses.

I have, however, once seen in private practice a deep-seated abscess of the neck supervene during the stage of convalescence, from what appears to have been cynanche tonsillaris.

CASE II.—A man, middle-aged, and of good constitution, with whom I was well acquainted, came to my office, some years ago, stating that he had recently had a "quinsy sore-throat," from which he was recovering, and that his throat was now becoming inflamed again, but in a different manner. He said the new attack had also caused much suffering. On examination, I found an inflammatory swelling of considerable size, as well as hard and brawny in feel, on the left front of his neck, extending

from the base of the lower jaw downward to the middle of the neck, or even lower; the skin covering it was tense, hot, and reddened; the swelling itself was very painful and sore; he could not bend his neck, and his head was twisted to the opposite side; he complained much of difficulty in swallowing (dysphagia), but could not open his mouth wide enough to allow me to look into his throat; by inserting my finger, however, I ascertained through the sense of touch that there was now no swelling of the tonsils, and that no retro-pharyngeal abscess existed, nor was one forming. Thus, it became clear that the external swelling was due to an acute inflammation of the deep connective tissue of the neck, and that an acute or phlegmonous abscess was probably being formed. I advised him to use saline diluents, for he was very thirsty, to take as much nourishment in the form of thin oat-meal gruel made with milk, and of beef-tea, as his dysphagia would permit, and to diligently poultice the inflamed part with flaxseed-meal cataplasms, frequently renewed. Three or four days afterward (for meanwhile I had visited him daily at his home), I satisfactorily discerned deep-seated fluctuation in the swelling, and announced my intention to lay it open at once, and thus give vent to the matter. But the patient objected to my haste on the ground that the abscess was not yet "ripe," inasmuch as no "pointing" had yet appeared. In reply I stated that this abscess, owing to the peculiar structure of the neck, was much more dangerous to life than most other abscesses, that before the purulent matter it contained could spontaneously burst through the deep cervical fascia so as to "point" externally, it would burrow more or less widely in the loose connective tissue between the deep-seated organs of the neck, and thus the abscess was very liable to cause sudden death by suffocation at any moment, unless its contents should be discharged externally by incising it. Then he suddenly remembered that his dysphagia was constantly increasing, that his breathing, too, was already much obstructed, and that he had been compelled to sit up through all the previous night in order to avoid a sense of impending suffocation which appeared as soon as he attempted to lie down. Thereupon, he quietly submitted.

Calling to mind the exact anatomical relation of the parts involved in the proposed operation, while the patient remained seated in his easy chair, but with his head firmly held by an assistant, I made an incision about one inch in length along a line corresponding with the inner border of the left sterno-cleido-mastoid muscle, over the summit of the swelling (the centre of which incision was on a level with the upper edge of the thyroid cartilage, and corresponded to the point where the fluctuation was most distinctly perceived), with a scalpel through the skin and platysma myoides; next, I cautiously raised and divided the superficial fascia on a slim director; then, recognizing the deep cervical fascia, it too was raised in a like manner, and cautiously divided, to the same extent as the cutaneous incision; now, using only my fingers and the rounded end of the director or grooved probe, I penetrated the underlying connective tissue with it, until purulent matter freely flowed in the track made by it, thus showing that the abscess cavity was sufficiently opened; about an ounce of laudable pus was immediately discharged; there was considerable sanguinolent oozing from the lips of the wound, but no vessel required ligation. The operation at once gave great relief. That night the patient was enabled to lie comfortably in bed. The dysphagia rapidly disappeared. The abscess healed from the bottom without difficulty under emollient cataplasms. His strength was rapidly restored

by a generous diet combined with bitter and ferruginous tonics, but a number of weeks elapsed before his countenance entirely lost the anæmic appearance it had acquired from the malady.

In comparing this case with the preceding one, certain points of difference are to be noted, notwithstanding the general parallelism: (1) The abscess was much more distinctly phlegmonous in the latter than in the former instance; (2) No policy of delay was allowed to postpone the operation for incising it, as soon as the presence of matter was satisfactorily discerned; and (3) this patient recovered. But, who can say what the result would not have been had the evacuation of this man's abscess, by incising it, been delayed from any cause for twenty-four, or even twelve hours? It seemed to me, however, quite clear at the time that he was exceedingly liable to perish suddenly of asphyxia within that period, at any moment, if vent were not given to the matter without delay by using the knife. This conviction arose in part from anatomical considerations, *e. g.*, the nearness of the abscess itself to the larynx, the dense structure of the deep cervical fascia and the great difficulty or slowness with which perforation of it is spontaneously effected by abscesses, together with the loose structure of the subjacent connective tissue and the readiness with which purulent matter may become diffused in it, especially under the strong pressure exerted by the act of proliferation when the expansion of the swelling is restrained externally by a strong membrane like the deep fascia of the neck; and likewise it arose in part from the presence of laryngeal dyspnœa resulting from the abscess, which already caused the patient much suffering, and now kept him entirely from lying down because it instantly threatened him with suffocation whenever he tried to assume a recumbent posture. The indications were therefore very plain that this highly dangerous abscess must immediately be evacuated; and without doubt, I think, had this abscess not been timely opened with the knife, I should now have another fatal instance to record, instead of a gratifying cure.

I have carefully detailed above the manner in which this abscess was laid open, because a very eminent writer in surgery has dogmatically declared concerning the opening of abscesses, without noting any exceptions whatever, as follows: "The surgeon should use a thin yet broad-shouldered, sharp-cutting, double-edged knife or scalpel. And having predetermined where to make his opening, and the probable thickness of the parts to be divided, he should plunge the instrument rapidly and boldly through the different tissues." (*Holmes's System of Surgery*, vol. i. p. 122, 2d edition.) Further on he asserts: "There are some surgeons, who, in opening an abscess, hold the knife as if they were dissecting, and cut successively through skin, subcutaneous tissue, fascia, etc. Such a practice should not be tolerated; it shows ignorance on the operator's part, and aggravates the patient's sufferings to an unbounded degree."

(*Ibid.*, p. 123.) Now, while I freely admit that these directions are sound so far as the operation for opening abscesses in general is concerned—for incising all those abscesses which are not in close proximity to great bloodvessels and nerves, or deeply seated, or of doubtful diagnosis—I at the same time firmly hold that it would be criminal recklessness for the surgeon to plunge a bistoury "rapidly and boldly through the different tissues" which cover the carotid artery, internal jugular vein, and pneumogastric nerve, into a deep-seated abscess of the neck which had not yet "pointed" or even approached the cutaneous surface, as must necessarily have been done in the cases related above, if the abscesses had been opened by a single thrust with a bistoury as practised for ordinary abscesses, and as recommended by this writer. When, however, a cervical abscess has already worked its way nearly to the cutaneous surface, or has become "pointed," and is therefore but thinly covered at its summit, it should always be opened with a single but a carefully guarded cut. But, when a deep-seated abscess of the neck is to be laid freely open along the course of the great bloodvessels of the neck, as in the examples presented above, it must be exposed in a manner strictly analogous to that which is directed by the canons of surgical art for uncovering the carotid sheath in the operation for deligating that vessel. The sufferings of the patient in such a case become a secondary consideration; and the avoidance of them therefore must not be allowed to endanger his safety. However, if time and place permit, anæsthesia should be produced before operating.

Sudden death results from abscesses underneath the sterno-cleido-mastoid muscle, or the continuance of life is greatly endangered thereby, much oftener, perhaps, than is generally supposed. The examples presented above are by no means unique. Mr. Holmes Coote says he has "known the disease prove fatal, by interfering with respiration," the matter having become diffused. (*Ibid.*, p. 125.) In 1847, a woman was in St. Bartholomew's Hospital for a cervical abscess, deeply seated, and raising the carotid vessels, which could be felt pulsating over it. There was numbness of both arms, and partial paralysis of the lower extremities. It was opened in order to obviate impending suffocation, and thick matter to the amount of seven or eight ounces was discharged. This was followed by immediate relief to all the symptoms; and the functions of the limbs slowly returned. (*Ibid.*, pp. 126, 127.)

I will further illustrate this important subject, about which we know far too little, by presenting a case taken from my note-book, wherein death by suffocation suddenly resulted from an extensive abscess underneath the sterno-thyroid and thyro-hyoid muscles:—

CASE III.—Jacob M., aged 55, was admitted to the State Emigrants' Hospital, at Ward's Island, on the evening of February 15, 1850 (the writer was one of the assistant physicians thereof at the time). The patient, when I examined him soon afterwards, presented the appear-

ance of a hard drinker, and was unable to give any account of himself in consequence seemingly of intoxication. His neck was observed to be considerably swollen; his face also was swollen and red, especially about the eyes, and presented the somewhat corrugated and desquamating look of tegumentary erysipelas beginning to subside. On the following morning, at an early hour, I saw him dying of asphyxia, his countenance being blue, lips livid, etc.; but his general condition was so bad, and the diagnosis so uncertain, that no operative procedure was thought to be warranted.

Autopsy, twenty-eight hours after death.—Cadaver not emaciated; rigor mortis well marked; the neck remains considerably swollen; the left side of face also still swollen. An extensive abscess was found immediately beneath the thyro-hyoid and sterno-thyroid muscles; it was bounded posteriorly by the thyroid cartilage and thyroid body; the connective tissue under these muscles had been largely consumed in its formation; it likewise extended downward under or behind the sterno-thyroid muscle nearly to the origin thereof, *i. e.*, to within an inch of the sternum; more than one-half of the external surface of the thyroid cartilage was laid bare by the abscess, but it was not eroded. The pharynx and fauces were inflamed; they also exhibited four or five follicular abscesses having the size of pigeon-shot. There was an erosion or ulcer on each lateral edge of the epiglottis at its base. The mucous membrane of the larynx and trachea was inflamed, but it exhibited no purulent matter or false membrane. The submaxillary glands on both sides were enlarged; those on the left contained a few points of infiltrated pus. Both parotid glands were likewise enlarged; the right one was also softened and extensively infiltrated with pus.

Right lung extensively fastened to chest by tolerably firm adhesions; inferior and middle lobes thereof in the third stage of pneumonia; superior lobe œdematous, and its apex contains some tubercles which have undergone a calcareous transformation. Left lung congested; its apex adherent, and contains a considerable quantity of tuberculous matter which has also become calcified. Bronchial glands enlarged and calcified. The bronchi contain considerable muco-purulent matter. Heart large and flabby; its right chambers are distended with blood, while its left are nearly empty. Liver larger by one-half than natural, and congested. Spleen three times larger than normal, and congested. Kidneys congested. Stomach actively congested; its mucous membrane thickened (apparently by a chronic process), and softened. Intestines in good condition. The congestion above mentioned was mostly venous, and therefore quite passive; it arose from the mode of death.

This man was already moribund when he came to hospital; and the autopsy shows that no chance then remained for the medical or surgical art to rescue him from death. Although his previous history is unknown, the objective phenomena observed after admission and the revelations made by the autopsy are instructive. Life was suddenly terminated by asphyxia; and the external evidences of this accident, the cyanotic hue of the countenance, etc., were strongly marked. But the internal evidences brought to light by the autopsy were not less striking. They were engorgement of the pulmonary artery and its branches, distension of the right cavities of the heart, while the left were nearly empty, and general

venous congestion. Moreover, the cervical abscess which caused the mischief was found to be still imprisoned within the deep cervical fascia. The abscess itself was shown to have resulted from an inflammation of the deep connective tissue which was widely destroyed thereby; the purulent matter it contained had shown no disposition to "point;" on the contrary, this matter, having cleanly dissected off the exterior of the larynx to a large extent, had followed the sterno-thyroid muscle downward almost to its origin, instead of making its way towards the cutaneous surface. In the conduct of this abscess Nature manifested no conservatism—no inclination to effect a spontaneous cure. Here we clearly perceive the chief reason why it is the surgeon's duty to at once lay open with the knife all deep-seated abscesses of the neck, namely, they do not tend to spontaneously get well, but, on the contrary, to destroy life. Finally, the autopsy of this man shows that, even had the cervical abscess been discerned and opened as soon as he came to the hospital, his life would not have been saved thereby, because there also existed an extensive purulent infiltration of the right parotid, and left submaxillary glands, and of the inferior and middle lobes of the right lung; and, no doubt, the symptoms of septicæmia, too, were present during life.

I can still further illustrate this comparatively obscure subject in a useful manner by presenting another example taken also from my note-book:—

CASE IV.—Margaret C., aged 40, born in Ireland, was admitted to the State Emigrants' Hospital, at Ward's Island, on October 18, 1849, where I was then one of the assistant physicians. She said her illness was of two weeks' standing. Her cheeks, neck, and throat were very much swollen at the time of admission; tongue swollen; the loose connective tissue about the root of tongue much swelled also, but most so on the right side; voice impaired; deglutition difficult; respiration fair. A view of her fauces could not be obtained from inability to open her mouth wide enough to allow it. There was but little redness and heat of the skin which covered the swollen throat, neck, and cheeks. Subsequently, the swelling of the tongue, and of the connective tissue about its root, gradually subsided; but difficulty of breathing (dyspnœa) came on in the evening, and increased in severity every evening until the 26th, eight days after admission, when she expired, in consequence of laryngeal asphyxia (œdema glottidis). On the 24th, two days before death, she began to expectorate an unhealthy pus, like that produced by erysipelas. On the day she died, this expectoration was very free, and the swelling of her neck diminished in proportion.

Autopsy, twenty hours after death.—Embonpoint preserved; some pale frothy fluid between the lips of the cadaver was noted. The deep connective tissue between the muscles of the throat, or anterior half of the neck, was found completely disorganized by an inflammatory process, so that pus and sloughs were present throughout, and an immense deep-seated abscess of the neck was thereby constituted. Pharyngitis also was present; it was most marked on the right side of the organ, where an aperture was found in its walls which communicated with the cavity of

the abscess, and through which the unhealthy pus expectorated during the last two days of life had obviously been discharged. Here the abscess evidently had burst into the pharynx. The larynx was inflamed; and an obstructive œdema of the glottis was found. Below the rima glottidis, the larynx and the upper part of the trachea were filled with colourless frothy serum. But little fibrinous exudation, and no ulcerations were found on the mucous membrane lining the larynx. The epiglottis was bright red in colour. The trachea was also inflamed. There were pleuritic adhesions, both interlobar and parietal, of a rather recent date, on the left side of the chest. The lungs were much congested, but otherwise normal. Liver enlarged and congested. Uterus gravid; it contained a fœtus in the fourth month of its development. There was venous congestion throughout the body, obviously caused by the mode in which death had been produced.

The mechanical cause of asphyxia, in this case, was œdema of the glottis. It resulted indirectly from the sloughing and suppurative inflammation (or abscess) of the deep cervical connective tissue, especially of the portion which surrounds the larynx, in consequence of the inflammatory process being propagated therefrom, through contiguity, to that organ. It may be well to remember, in this connection, that the upper part of the trachea, the epiglottis, and the pharynx, had also become inflamed in the same way. Moreover, the œdema glottidis, which killed this patient, ensued, notwithstanding the fact that the abscess itself had burst two days before and spontaneously discharged most of its contents.

The suppuration in this instance was an unhealthy one, as was evidenced by the matter discharged during life, and by the contents of the abscess revealed by necroscopy. Thus, it is shown that the connective tissue inflammation which produced it was an unhealthy inflammation, and one which naturally tended to become diffused rather than to remain circumscribed. Here we should note particularly that the patient was a poor, ill-fed, Irish peasant woman, who had but recently come to America, and that her depraved general condition had probably determined the character of the local inflammation. Now, experience has abundantly shown that there is but a very small chance to save such examples of a diffuse and rapidly destructive inflammation of the connective tissue between the deep muscles, especially of the neck, unless there be employed from the outset a strongly supporting plan of treatment, *e. g.*, tincture of the ferric chloride and quinine with alcoholics, in full doses, and a diet easily digestible, and as highly nutritious as possible; together with deep incisions made as freely and as early as possible, in such a way as to liberate completely the sloughing tissue and the purulent matter as soon as they exist. From the want of such remedial measures seasonably applied, this patient, when she entered the hospital two weeks after her malady began, was in reality too far gone to be saved by any plan of treatment. But why was there no attempt made to

relieve the laryngeal obstruction—the œdema glottidis—by performing a surgical operation? It was because the larynx and upper part of the trachea were so completely surrounded by the abscess-cavity above mentioned, in front as well as on both sides, that the operation of laryngotomy or tracheotomy could not be performed without great difficulty, and even then did not offer any reasonable hope of success, because, if the windpipe were opened by an incision, the matter from the huge abscess would suffocate the patient by flowing downward into that tube. Moreover, the closure of her mouth in consequence of tumefaction, etc., utterly precluded any operation from that direction.

This example, then, affords another melancholy illustration of what is certain to ensue in cases of deep cervical abscess, whenever the requisite plan of treatment is not seasonably employed. It also shows, like the preceding case, that such abscesses, when allowed to run their own course, do not exhibit any tendency to a spontaneous cure; but, on the contrary, they always tend to destroy life.

To complete the consideration of this branch of the subject, it is, perhaps, well to briefly state that deeply seated abscesses of the neck may burrow widely in other directions, and thus result in death. For instance, a man aged 31 entered St. Bartholomew's Hospital with pneumothorax on the right side and general emphysema. He had, however, suffered for some time before these disorders appeared, from pain in his throat and difficulty in swallowing. The autopsy revealed an abscess in the deep connective tissue of his neck, which had burrowed extensively therein, and had likewise burst in two directions, namely, into the upper part of the œsophagus on one side, and into the right pleural cavity on the other. (*Ibid.*, p. 125.) Mr. Callender has examined post-mortem two cases in which there was a deep-seated, burrowing abscess of the neck; in one of them, the pus made its way into the anterior mediastinum; in the other, it surrounded the trachea and extended downward to the roots of the lungs.

But enough has been said to clearly show that the earlier all deep-seated abscesses of the neck are laid open and evacuated the better for both patient and surgeon. And wheresoever, in such cases, the abscess may form, the plan of treatment is always the same. As soon as fluctuation is discerned, the surgeon must proceed without delay to discharge the matter by making a suitable incision, in order that the abscess may not spread downward into the thoracic cavity, nor burst into any part essential to life, nor suddenly cause death by asphyxia.

Moreover, every medical man should impress indelibly upon his memory the fact (which has been clearly shown above), that deep-seated abscesses of the throat or neck do not, as a rule, tend to spontaneously get well; that if they be let alone, or be expectantly or inadequately treated in any other way, they naturally act destructively by burrowing or spreading, etc., and thus kill with great certainty; that there are but few if any

exceptions to this rule; and, finally, that in all cervical abscesses which are deeply seated, as well as in all cerebral abscesses, the practitioner has no right ever, for a single moment, to expect a successful result unless the matter be promptly discharged by making a suitable incision. The corollary to this proposition is obvious: Should the practitioner not feel himself quite competent to undertake such an operation while the matter is still far below the cutaneous surface and close to the great bloodvessels of the neck, or should he have any doubts about his own ability to discern fluctuation, in such cases, while it is still deeply seated, by the tactile sense alone, he must get competent assistance without delay; for, by waiting under such circumstances, he will always diminish considerably, and sometimes destroy utterly, his patient's chance of recovery.

Besides an extremely early evacuation by means of a suitable incision, the abscesses described above usually demand the employment of Chassaignac's drainage-tubes and antiseptic dressings; this point in their treatment I here mention once for all.

Brief mention, too, must be made in this place of *retro-pharyngeal abscesses*, inasmuch as they are always difficult to treat, and are very liable to cause sudden death; and because, from their kinship thereto, their description naturally follows that of deep-seated cervical abscesses in general. The following examples will serve to illustrate their symptomatology, as well as the chief dangers which attend them.

CASE V.—Dr. Levertin (*Hygiea*, Bd. xxi. p. 692) reports the case of a peasant, aged 46, who, after recovery from typhus and gastric fever, was attacked with dysphagia, on October 13th. Nothing wrong was found in the neck. Next day, the dysphagia was so great that not even a drop of water could be swallowed; fits of suffocation also occurred.

17*th*. A swelling was discovered in the pharynx, and tracheotomy was performed by Professor Sautesson. This was followed by some improvement in breathing and swallowing; but death took place on the 19th.

Autopsy.—The œsophagus, etc., having been laid open from behind, two yellow points were found in its anterior wall, over the arytenoid cartilages. A probe, having been passed into the point on the right side, slipped into the cavity of an abscess as large as a hazel-nut. The larynx was highly inflamed; but the abscess-cavity did not communicate with it. (*New Sydenham Soc. Year-Book* for 1861, pp. 248, 249.)

The symptoms which resulted from the abscess in this instance were (*a*) dysphagia, which came on suddenly and increased so rapidly that on the day following the attack nothing whatever could be swallowed; and (*b*) a swelling containing purulent matter which projected into the pharynx. Fits of suffocation also supervened as soon as the inflammatory process had spread by contiguity to the larynx; and, notwithstanding that the operation of tracheotomy appears to have been seasonably performed, this secondary laryngitis caused death by asphyxia. The only operation which might have saved this patient was the puncturing of the abscess

and the discharge of its contents, at an early period in its growth, and before the inflammation had yet spread from the abscess to the larynx.

CASE VI.—A powerful young man, aged 15 (*Würtemb. Corresp. Blatt.* xiv. 1858), experienced pain and swelling at the back of his throat, with inability to turn his head and to open his mouth. There was a painful swelling found in the right parotid region; tonsils normal; no fever. During the first fourteen days the symptoms were somewhat severe, sometimes easier. On the sixteenth day, hemorrhage from the mouth and nose occurred. On the eighteenth day, the swelling at the back of his throat opened spontaneously, and discharged a quantity of bloody, wine-lees-coloured pus. But the swelling was still visible behind the soft palate. After some hours, about a pint of bright-red blood suddenly issued from his mouth and nose; its source was never discovered. Four days later, another hemorrhage occurred, but from the mouth alone. On the following day, a hemorrhage still more severe took place from his nostrils. The external swelling became larger and more painful. In the fourth week, the retro-pharyngeal abscess burst a second time, under precisely similar circumstances, and gave ease to the patient, with cessation of cough, etc. The internal swelling pushed the uvula forward; but, as this swelling abated, the external swelling was correspondingly diminished. The patient, however, died suddenly one night from hemorrhage, which had recurred in a severe form after an interval of fourteen days.

Autopsy.—A carious piece of bone was found on the anterior surface of the body of the atlas. There was an abscess cavity in the connective tissue between the right tonsil and parotid gland, about the branches of the carotid artery, having the size of a hen's egg. It was filled with blood-clot; but the immediate source of the hemorrhage was still uncertain. Two small openings through the wall of the abscess into the mouth were found. (*Holmes's System of Surgery*, vol. i. pp. 133, 134, 2d ed.)

This abscess arose from caries of the body of the first cervical vertebra. The symptoms which it presented were pain, soreness, and swelling at the back part of the throat, with dysphagia and inability to turn the head. But the diagnostic sign was the swelling caused by the abscess itself, which was situated behind the curtain of the palate and on the posterior wall of the fauces, and was plainly perceivable by the senses of both touch and sight. To these symptoms, some phenomena were superadded which may with propriety be termed accidental, because they resulted from a casual extension of the abscess-cavity toward the right parotid gland. The diagnosis in this instance was easily made; as, indeed, it generally is in the examples of this affection where the buccal and faucial cavities are accurately examined by sight and touch, or even by the educated touch alone, when the patient's mouth cannot be opened widely enough to obtain a view. But this patient suddenly expired from hemorrhage, caused by the erosion of some sufficiently important bloodvessel in the abscess-cavity. On this sort of hemorrhage, however, it will presently be necessary to speak again.

Some additional points in the history of this highly dangerous disorder

can best be illustrated by briefly mentioning an example which was treated by the writer with success, some years ago, in Bellevue Hospital.

CASE VII.—The patient was an Irish woman, aged about 30, rather lean and pale, but free from constitutional taints, who said she had been ill but a few days with sore throat and dysphagia. Her voice was much affected, her mouth partly open, and her breath on issuing from it very offensive or stinking. She complained of pain and soreness in the fauces, and that they were greatly aggravated by all attempts to swallow (*i. e.*, there was much dysphagia). Her neck was stiff, and she was unable to rotate her head. Externally, there was a tender and painful swelling found in each parotid region. Her mouth would not open wide enough to afford a view of her fauces. On inserting the right index finger, however, I discovered a rather soft swelling which projected into the pharynx from behind to a considerable distance, apparently almost to the soft palate, and that both tonsils were normal. Believing that I now had to deal with a retro-pharyngeal abscess, I determined to lay it open at once; and, taking in my right hand a long straight, but narrow bistoury or finger-knife, whose cutting-edge was covered with adhesive plaster, excepting about one-third of an inch at its point, while she was sitting in a chair with her head firmly held by an assistant against his breast, and her teeth were separated by a cork, so that she could not bite, being guided into her mouth by the index finger of my left hand with which her tongue was simultaneously depressed, I passed the instrument directly backward into the centre of the swelling, and incised it vertically as freely as possible, in the middle line. A considerable quantity of pus mixed with blood was immediately discharged, which afforded great relief. It was directed that her throat should frequently be swabbed with liquor sodæ chlorinatæ diluted with water (part 1 to parts 10), that tincture of the ferric chloride with quinia should be administered in full doses, that milk punch, too, should be freely given, and that a nourishing diet, consisting of chicken-broth, beef-tea, eggs, and anything she could swallow, should be allowed. The abscess became refilled twice; but it was promptly re-opened each time, in the manner described above. In the end, the patient completely recovered. My unhappy experience with the emigrant cases related above, no doubt, had prepared me to treat this case with much greater satisfaction.

To recapitulate some of the chief points in the history of this highly dangerous disorder: (1) It may result from disease of the cervical vertebræ, on the one hand, and from connective tissue inflammation, on the other. (2) It may cause sudden death by inducing suffocation, by leading to starvation, and by producing a great hemorrhage. (3) In order to treat this grave disorder with success, it is necessary that the diagnosis should be made at an early date, that the pus should be promptly discharged by making a suitable puncture (the earlier the better), that the matter should be promptly let out again and again should the abscess refill, and that chlorinated gargles or washes, with a strongly supporting plan of treatment, should be employed.

Furthermore, various abscesses of the neck may cause sudden death by *eroding* the cervical bloodvessels, and thus suddenly producing a great *hemorrhage*. A striking example of this accident has just been presented.

It seems, too, that our predecessors were familiar with this occurrence in other parts of the body, as well as in the neck; for John Pearson (*Principles of Surgery*, pp. 99, 100, London, 1788) observes, in a general way, as follows: "Although the larger arteries have been known to be surrounded with purulent matter for a considerable time without suffering any injury, yet this is not universally the case; there have occurred many instances where erosion has taken place, and the person has been suddenly destroyed with hemorrhage." It is probable that dangerous hemorrhage results from this cause in the cervical region much oftener than many suppose. The late Dr. George McClellan, of Philadelphia, has recorded two instances, brief abstracts of which should here be given:—

CASE VIII.—Mr. Slack, prothonotary at Mount Holly, N. J., had epidemic influenza, which terminated in a critical abscess of a submaxillary gland. This abscess, on being lanced, discharged an ichorous sanies. A few days afterward, a violent hemorrhage broke out, and continued in spite of pressure and cold applications until complete syncope. As often as he reacted, from day to day, the hemorrhage returned, and produced a renewed fainting. After several repetitions of this process, an alarming prostration supervened, and Dr. McClellan was called in consultation. He says: "As the hemorrhage plainly proceeded from some artery in the abscess-cavity, I dilated the orifice through the purple and undermined integument and fascia of the throat and jaw; and, on sponging out the soft coagula, I found that the facial artery had been ulcerated into, just as it passed over the base of the jaw-bone, and that its loose end hung down and pulsated into the cavity of the abscess. I held it between a thumb and finger, applied the ligature; but it proved to be so soft and rotten, that the thread cut through it instantly. I repeated the same attempt twice, nearer the origin of the artery; the last time even after dissecting it out a little from above the submaxillary gland, and underneath the jaw, and the same result followed. The cellular sheath appeared to have been dissolved or softened by the morbid inflammation and unhealthy suppuration which had produced the abscess. As the hemorrhage was greatly increased by these attempts, I seized a spike of iron from the kitchen-wall, and, after heating it red-hot in the stove, I applied its point to the bleeding orifice. The hemorrhage then ceased permanently; and, on applying creasote washes, and ordering tonics and improved diet, we shortly had the pleasure of his perfect recovery." (*Principles and Practice of Surgery*, p. 200, Philadelphia, 1848.)

CASE IX.—The second case occurred in the person of Mr. Ashman, of Ohio, after a great deal of inflammation and mechanical disturbance about the throat, in consequence of severe operations for securing the external carotid artery, and afterwards the internal carotid, in connection with the extirpation of a scirrhous parotid gland. After the wounds of operation had nearly cicatrized, and the patient had recovered strength enough to go out, the lower angle of the old wound broke open afresh, and discharged a violent hemorrhage. This repeatedly occurred, and finally made a large cavity beside the larynx and trachea. On laying it freely open, the superior thyroid artery was discovered at the bottom of the wound, exposed for fully one inch, with a rent or fissure in its tube, from which the blood was welling out. On attempting to ligature it, the thread cut through its tunics at every trial exactly as in the preceding case. Dr. McClellan

says: "I then took a pointed stick of pure lunar caustic, and seared the two ends thoroughly, and afterwards pressed a dossil of lint wet with pure creasote upon them. This commanded the hemorrhage effectually, and the patient recovered by a return of healthy suppuration and granulation, under the use of tonics." (*Ibid.*, pp. 200, 201.)

This sagacious observer also remarks, in substance, that the various instances, which have been reported, of arteries, and of even veins, having been opened by ulceration or erosion into the cavities of neighbouring abscesses, must be classed in the same category. The softening of their coats by a peculiar species of inflammatory *ramollissement* has led the way to the hemorrhage. Such cases, instead of resulting from a hemorrhagic diathesis or a constitutional predisposition, are plainly derivable from the depraved character of the inflammation which has preceded them. In further support of this view he declares: "I have known of several cases of sudden death from hemorrhage from abscesses and irritable sinuous ulcers in the throat, which resulted from malignant scarlatina in children, all of which undoubtedly must have occurred in the same way." (*Ibid.*, p. 201.)

But the abscesses which result from ordinary tonsillitis (or cynanche tonsillaris) have been attended by fatal or very dangerous hemorrhages, in consequence of the adjoining bloodvessels being eroded, with peculiar frequency. Many instances thereof have been recorded. Dr. Ehrmann reports (*Centralblatt für Chir.*, No. 34, 1879) the following instructive case:—

CASE X.—An Italian, a young man, entered hospital for angina tonsillaris. On the third day the abscess spontaneously burst open, and immediately half a litre of bright-red blood poured from the mouth. Three hours later the hemorrhage recurred, but in less quantity. No pulsation in the tonsillary swelling was perceptible. A third hemorrhage, more severe than the others united, led to the tying of the common carotid artery with two threads, between which it was severed. The hemorrhage ceased permanently. No cerebral symptoms ensued, excepting aphonia, which disappeared in four days. In six weeks he was discharged cured. (*New York Medical Journal*, October, 1879.)

It is not improbable that in some, perhaps in most, of the cases in which the puncturing of a tonsillary abscess is said to have been attended with a fatal or a very dangerous hemorrhage, the loss of blood has in reality been caused by an erosion of the tunics of the bleeding vessel effected by the abscess itself, and not by any wound of these tunics inflicted by the surgeon's knife. Such occurrences have been noted now and then ever since the time of Portal, who mentions a case in which, while opening a tonsillary abscess with a pharyngotome, "a dexterous surgeon of Montpellier had the misfortune to open a large artery, and see the patient perish of a hemorrhage so severe that nothing could arrest it." (*Cours d'Anatomie Médicale*, t. v. p. 509.)

It seems to the writer more probable, however, that the arterial tube even in this case was spontaneously opened by the disease, than that it was accidentally punctured by a dexterous surgeon; the arterial tunics well may have become so much weakened by the morbid process that they yielded to the blood-pressure as soon as the external support afforded by the contents of the abscess was withdrawn by puncturing it, and then the bleeding would have occurred just the same if the abscess had burst spontaneously, instead of being opened by the surgeon. Moreover, in Dr. Ehrmann's case just related, the hemorrhage with which the spontaneous opening of the abscess was immediately attended would have been erroneously attributed to the operation of puncture, if that operation had been performed. The same criticisms are applicable to the other cases belonging to this category. For example: "Tyrrell was accustomed to mention, in his surgical lectures, a case to which he was fetched by a practitioner, who, having punctured an abscess in the tonsil-gland, the wound was immediately followed by severe bleeding, and the patient was dead before he could reach the house." Again: Sir Benjamin Brodie was "cognizant of two cases in which death ensued after the puncture of tonsillar abscess." (*South's Notes to Chelius' Surgery*, vol. i. p. 162, Am. ed.) But it does not appear that in either of these cases the arterial lesion was accurately determined by a post-mortem examination; and, in the absence of such information, it seems more probable that the hemorrhage in each instance was caused by disease of the arterial tunics, as it was in Dr. Ehrmann's case, than by wounds of these tunics inflicted by surgeons. I have dwelt upon this point somewhat, because it is of much practical importance that such hemorrhages should always be attributed to the right cause.

It is also of importance to know that in cases of spontaneous hemorrhage from tonsillary abscess, the erosive action or ulceration may have opened some branch of the external carotid artery, as well as the trunk of the internal carotid; and that the occurrence of such hemorrhages is not restricted to the lesion of a single artery.

On taking a comprehensive view of the subject, it would seem that abscesses in the neck are more frequently attended with hemorrhages due to the opening of important bloodvessels by ulceration or erosion, and by *ramollissement* consequent upon the disorders themselves, than abscesses in the other surgical regions. The superior liability of cervical abscesses to the spontaneous occurrence of dangerous hemorrhages arises in part from the greater number and importance of the cervical bloodvessels; but more particularly, I think, from the inanition and exhaustion, or low state of the constitutional powers, and consequent feebleness of the reparative forces, which rapidly result from most of the deep abscesses of the neck, or rather from the inability to swallow enough food to support life, and from the powerlessness to get any refreshing sleep, or even repose,

with which these abscesses are oftentimes attended. The septic or toxæmic influence of the fetid secretions and exudations which present themselves in the oral and faucial cavities in many instances, also aids materially to still further depress the patient, and weaken the reparative processes of his system.

Finally, how should the hemorrhages which spring from these cervical abscesses be treated? The chief points in the therapeusis, both chirurgical and medical, have already been mentioned while presenting the several examples of this accident. To briefly recapitulate them: The abscess-cavity in such cases always should be freely laid open, the coagula turned out, the bleeding point or source of the hemorrhage brought distinctly into view, and the delinquent vessel itself should be ligatured on each side of the aperture in its walls. But should the ligatures cut through, *i. e.*, should the vessel's tunics prove to be too soft or too weak to hold the threads, the actual cautery must be applied to the bleeding point, as was practised by McClellan under such circumstances, as stated above. And especially is the practitioner to be warned against the use of liquor ferri persulphat. or perchlorid. as styptics in such cases; because, if he employ these acid ferric salts, he will not unfrequently fail to suppress the bleeding permanently, on the one hand, while he will, at the same time, always do considerable harm by causing a hard and quite insoluble coagulum to be formed by them which will greatly interfere with the subsequent application of ligatures or of the actual cautery in cases of failure to control the hemorrhage; and, even in cases of success, will greatly retard the cure, from irritation and difficulty of removal.

An antiseptic plan of after-treatment, with thorough drainage of the abscess-cavity by means of Chassaignac's tubes, is generally of much value in cases of hemorrhage from cervical abscesses; and it is of interest to note in this connection that the sagacious McClellan had already found, long prior to his sudden death in 1847, the great value of antiseptic dressings in such cases, and he makes particular mention of "*creasote washes*," *i. e.*, lotions containing impure carbolic and cresylic acids. To this plan of after-treatment, the ferruginous and bitter tonics, *e. g.*, quinine and iron, in full doses, should be added, together with milk-punch, wine, or porter, and a very nourishing diet.

But what should be done in cases where the abscess-cavity cannot be laid open, so as to expose the bleeding vessel to view, and allow it to be secured with ligatures, or restrained from bleeding by applying the actual cautery? In such cases, the primitive carotid artery should be firmly compressed against the cervical vertebræ by the surgeon's thumb or fingers applied on the anterior part of the corresponding side of the neck, between the larynx or trachea and the inner border of the sterno-cleido-mastoid muscle, with force enough to press the artery backward and inward against these vertebræ, and flatten it thereon. This pressure should be

exerted continuously and sufficiently, as well as in the right direction to embrace the artery between it and the bone; also long enough for the apertures to become securely plugged with coagula, if possible. Should this procedure fail, it will be advisable, especially in cases where the bleeding proceeds from tonsillary abscesses, to ligature at once the primitive carotid artery. This vessel is to be selected for deligation in such cases because it cannot be determined during life whether the hemorrhage from a tonsillary abscess has its source in a branch of the external carotid artery or in the trunk of the internal carotid artery, as already stated above. And by the timely performance of this operation, in such cases, the surgeon may often be gratified, as, indeed, Dr. Ehrmann, mentioned above, was gratified in seeing the hemorrhage permanently suppressed and his patient saved.

What plan of treatment might possibly have saved the case of retro-pharyngeal abscess, mentioned above (Case VI.), in which death from hemorrhage suddenly occurred? It should, in the first place, be observed that the collection of matter was what our predecessors were wont to term a *congestive*, instead of a *phlegmonous* abscess, *i. e.*, the purulent matter having been formed elsewhere, in consequence of caries of the first vertebra, had settled downward behind the pharynx, etc., and therefore this matter was not the product of connective-tissue inflammation behind the pharynx. It may well be that, had this purulent depot been fully emptied by an early-made incision, and subsequently kept empty in the same way, had the patient's throat been cleansed at short intervals with chlorinated washes (*e. g.*, liquor sodæ chlorinat., part 1, to aqua, parts 8 or 10), and had his strength been sustained by administering iron and quinia, with alcoholics, and all nutritious kinds of food which could have been swallowed, the systemic deterioration and the hemorrhage resulting therefrom would have been prevented.

ARTICLE II.

A CONTRIBUTION TO THE GENERAL KNOWLEDGE CONCERNING THE PRURIGO PAPULE. By ROBERT B. MORISON, M.D., of Baltimore.

ALTHOUGH there has been much written about, and many descriptions made of, the histology of the prurigo papule, the opinions of authors have not always agreed; and it was with the idea of settling as far as possible the disputed points and differences, that I undertook the following investigations in Prof. Chiari's pathological institute at Prague, on material kindly furnished by Prof. Pick, which was taken *intra vitam* at various stages of the disease under the latter's personal supervision.

Earlier authors examined the skin after death, or were satisfied with a few specimens taken *intra vitam*, but the material furnished me by Prof. Pick has been such that no stage of the disease has been wanting. No other, then, has had the chance thus offered for a careful and thorough investigation into the changes occurring in prurigo.

Before the time of Hebra, prurigo and pruritus were synonymous terms. Willan[1] divided prurigo into four classes: P. mitis, P. formicans, P. senilis, P. sine papulis. His idea was that the itching represented the chief symptom, and that the absence or presence of papules did not change the character of the disease. Macroscopically, he describes them as soft and smooth, rather larger and less pointed than those of lichen, and as seldom red or inflamed, excepting when rubbed or scratched. They are covered with crusts formed from the thickening of a watery fluid mixed with blood contained within them, which is seen when the tops of the papules are removed in any way. The author looks upon the disease as a neurosis.

Bateman[2] follows Willan in his description of the papule, as does also Plumbe,[3] the latter remarking that they are in no way necessarily present in the disease known as prurigo, and that in fact, in most cases coming under the notice of a physician, itching is the only symptom.

Alibert,[4] also recognizing no difference between pruritus and prurigo, says, however, that this disease, which he calls "psoride papuleuse," consists of a characteristic eruption of papules which in form and colour resemble the skin.

Cazenave[5] describes them more minutely, and says that they are sometimes small, slightly raised above the skin, perceptible to the touch, and accompanied with severe itching; at other times they are larger, more elevated, and accompanied with itching, which is unbearable. They never touch each other, and have generally the same colour as the skin, when they have not been torn by the nails. When present in great quantities, and when their tops are scratched off, a drop of blood escapes which coagulates and forms a characteristic crust. In many cases this crust falls off, leaving behind a somewhat prominent point. Sometimes the papule disappears entirely with it. Those papules which have not been torn off, either disperse themselves, or disappear by the formation of fine scales which afterward drop off. Where the disease has lasted for a long time, they are hard, very large and prominent. The eruption is accompanied with a noticeable thickening of the skin.

The same author[6] considers prurigo an inflammation of the nerve end-

[1] On Cutaneous Diseases, 1808.
[2] Practical Treatise on Skin Diseases, 1835.
[3] On Diseases of the Skin, 1827.
[4] Descriptions des Maladies de la Peau, 1825.
[5] Abrégé pratique des Maladies de la Peau, etc., 1838.
[6] Gaz. des Hôp. 1847, p. 104.

ings, *i. e.*, a hyperæsthesia, and the eruption as only accidental. He makes no difference between pruritus and prurigo.

A. Simon,[1] in describing the minute anatomy of the papule, found the epidermis intact, the papillæ not enlarged, and the connective tissue not changed. According to the author, the papule is, therefore, probably due to a simple infiltration of the skin with serous fluid. He does not agree with Hebra, that the fluid which escapes from a papule is contained in a hair follicle.

Wedl[2] described the larger papules as often filled with a yellowish fluid, and pierced with several hairs. The papillæ were tinged with blood, and red points could be seen similar to an injected loop of blood-vessels.

Canuet[3] explains lichen and prurigo as neuroses of the skin. In his opinion both diseases agree in their premonitory symptoms and sequelæ, and only differ in the character of the eruption, which he considers of secondary importance, and which may indeed be absent without, however, affecting the intensity of the other symptoms. He considers that the symptoms of both accord with those of a neurosis, and it is not infrequent to see first lichen, then prurigo, indeed, sometimes, both diseases at the same time, upon the same individual, coming from the same causes, and appearing under the same circumstances. They are usually seen in nervous individuals, especially in women, and in nearly half the cases after a sudden emotion.

It can plainly be seen that this author does not consider prurigo as a distinct disease in the sense of either Willan or Hebra.

Von Baerensprung[4] does not consider the disease a neurosis. The papules appear upon the skin, together with a feeling of increased warmth, and are always without fluid contents. If torn with a needle, it is possible to draw out a sebaceous gland filled with a dense layer of cells, and looking like a small sac. The papules are, therefore, not inflamed papillæ, but sebaceous glands, which, instead of secreting sebum, are filled with epithelial cells, and this gives the paper-like dryness, and dirty yellow colour to the skin.

Von Veiel[5] looks upon the disease as hereditary, and apparently does not distinguish between it and pruritus, although he does not seem to look upon the former as a neurosis. It usually skips one generation, being handed down from grandparent to grandchild.

This author stands alone in his opinion, that the disease can be handed down as an inheritance.

[1] Die Hautkrankheiten durch Anatom. Untersuch. 1857.
[2] Grundzuge der path. Histologie, Wien, 1854, p. 247.
[3] Gaz. des Hôp. 1856, 126.
[4] Ann. d. Charité zu Berlin, viii. 1858.
[5] Prag. Vierteljahresschrift f. Prak. Heilk. 1862, p. 70.

Charcot and Vulpian,[1] in treating cases of progressive locomotor ataxia with nitrate of silver, noticed that sometimes an eruption resembling prurigo would break out upon the whole body, but especially upon the legs, and which would last as long as the silver was used.

Tilbury Fox[2] describes the papules as pale, and due to an exudation in the skin. They are caused by a disturbance in regeneration and innervation, particularly in paresis of the nerves. Where there is a predisposition to the disease, he considers that the prurigo papule may be accelerated in its development by the presence of parasites, or insects, and may attain its customary appearance in consequence of scratching.

It was Schönlein who first pointed out the connection of the diseases of the urinary organs to prurigo, and to this connection Eydam[3] calls especial attention by relating several instructive cases.

Derby[4] found every papule pierced by a hair, and the external layer of the sheath pouched where the hair muscle joined it. This pouch, composed of epithelial cells similar to those of the sheath, and with which it was in close connection, pushed itself between the cells of the muscle. He describes also marked hypertrophy of the M. arrectores, the cells of which appeared thicker than normal, sharply outlined, and granular; the hair itself more perpendicular, thinner, and very friable. Surrounding the lower part of the hair sheath could be seen a large number of round, shiny cells, which carmine coloured deeply. The bloodvessels of the hair, the corium, and the papillæ of the skin enlarged; the cutis filled with spaces surrounded by connective tissue, in which here and there exudation-cells could be seen. These spaces, according to the author, are due to a serous exudation, which expands the normally very narrow lymph-spaces, and which escapes from the papules when they are opened, as a clear or rather bloody drop.

From his investigations is explained, according to Derby, why the prurigo papule does not appear in places devoid of hair, such as the palm of the hand, the sole of the foot, and also very seldom upon the flexor side of the extremities, where few hairs grow. In an old case of prurigo Derby found all the appearances so often seen in a chronic dermatitis, such as lengthened and broadened papillæ; the corium everywhere filled with a serous fluid; the rete Malpighii much thickened, its lower layer of cells long drawn out, narrow, cylindrical, in the middle layer well-defined prickle cells; between both layers many wandering cells, in the protoplasm of which brown pigment bodies were inclosed.

Gay,[5] using the skin of a person ten years old, who died of pneumonia, describes the changes found in pieces taken from various parts of the body.

[1] Bull. de Thér., t. lxii. June, 1862.
[2] Transact. St. Andrew's Med. Assoc. iii. 1869.
[3] Deutsche Klin. 38-39, 1860.
[4] Sitzgsb. d. Wien. Akad. B. LIX. H. 2.
[5] Archiv f. Derm. und Syph. 1871, H. 1.

He considers these changes divisible into two groups: the first, including those of the rete Malpighii, and the organs standing in connection with it, such as the hair sheaths and sweat glands; and the second, including those in the corium and papillæ. In the rete Malpighii he describes cells containing single or double nuclei, with their centres drawn in like a biscuit. He calls attention to the extraordinary ease with which the nuclei of many cells, as well as the cells themselves in the deeper layers, are tinged with carmine. In severe cases these cells have the character of horny epithelium; there is also enlargement of the sweat glands and of the vessels of the hair papillæ.

The result of his investigations leads him to the following opinion: The pruriginous process begins in the papillæ of the corium, and the tissue of the same is, after a dilatation of the vessels, which can be proven to take place microscopically, much richer than normal in cells. After this exudation, the rete Malpighii becomes infiltrated with small cells and thickened, while the stratum corneum also becomes thickened, because the upper layer of the rete Malpighii changes its character, and becomes horny. Hand in hand with the changes in the rete Malpighii a cell infiltration occurs around the hair sheath. The increase in the cells of the outer layer of the sheath is confined to single places, principally in the neighbourhood of the muscles. The latter are hypertrophied. The sweat glands take part in the process in the same intense manner as the hair sheaths.

Hebra[1] does not think it necessary to change his opinion since the first edition of his book with regard to the anatomy of the prurigo papule. He considers that it is, in all respects, like a vesicle, differing from the latter only in the small amount of fluid contained in it, and in the thickness of the epidermis which covers it. Further, that after a severe attack, the glandular apparatus of the skin suffers through sympathy, and, lastly, that the changes which one sees in chronic cases do not belong to prurigo alone, but to any chronic disease which has affected the skin for a long time.

If one examines a lately affected piece of skin containing a single prurigo papule, the papillæ are found somewhat enlarged, tissues œdematous, and containing a moderate number of cells covered with a stratum of epidermis, containing in the deeper layers swollen-up or proliferating cells, sometimes wandering cells. He considers that the papule of prurigo is formed by a collection of fluid in the deeper layers of the epidermis, and by the consequent elevation of its upper layers.

Klemm[2] considers prurigo to be due to an affection of the nerves, and that the papules follow the primary itching, as in herpes zoster, and, according to this author, it has not been shown by experience that the disease attacks by preference sickly children, or such as suffer from rhachitis, scrofula, etc.

[1] Lehrbuch der Hautkrankheiten, 1874.

[2] Jahrb. f. Kinderk. 4 H. 1874.

Eisenschutz,[1] on the other hand, says that even the worst cases of pruritus are never followed by a true prurigo, and does not agree with K. that the itching is caused by the presence of serum and pus in the vesicles, or that arsenic has any especial effect upon the disease.

Anstie[2] does not distinguish between pruritus and prurigo, since he speaks of prurigo senilis, meaning, in Hebra's sense, pruritus.

Duhring[3] uses the term prurigo in the sense attached to it by Hebra, and cites Hebra, Derby, Neumann, and Gay for the pathology of the papule. In his ideas of the disease he differs from the majority of English and American writers. It is a rare disease, according to this author, in America and England as well as in France.

Piffard[4] follows Hebra in the description of the disease.

O. Simon[5] agrees on the whole with the descriptions of Derby, Gay, etc., but found quite the same changes from investigations of other chronic inflammatory conditions of the skin, and would not accord to them any pathognomonic signification for prurigo. Especially does this hold good respecting the changes in the hair sheath and muscles.

Esoff,[6] in examining normal skin, frequently found epithelial pouches springing from the outer layer of the hair sheath, and these he divided into two groups. To the first belong those which are not connected with the M. arrectores, and also those described by Neumann as peculiar to lichen ruber. These appear in the form of long pouches, which contain a hair shaft.

To the second group belong those which are seen at the insertion of the M. arrectores. These pouches also begin in the outer sheath layer, and are a continuation of the same. In this group, both in respect to their size and position, the author includes those pouches described by Gay and Derby in prurigo.

Neumann[7] considers the prurigo papule due to a cellular infiltration and serous exudation of the papillæ. The rete Malpighii is hypertrophied, its cells rich in pigment. The papillæ are enlarged, their tissue meshy, the cutis thickened by tense connective tissue, the walls of the vessels thickened in places, with an increase of cells of the external sheath layer. The hair follicles are pouched out in the form of clubs, the smooth muscular fibres hypertrophied. He considers that a careful study of the nerves of the skin must be undertaken to decide whether or not an anatomical change in them is not the cause of the disease.

Auspitz,[8] reasoning upon the investigations of others, is of the opinion

[1] Wiener, Rundschau. Sep. 1874.
[2] Journ. Ment. Sc. xvi. April, 1870.
[3] Diseases of the Skin, 1877.
[4] An Elementary Treatise of Dis. of the Skin.
[5] Berlin. Klin. Wochenschrift, No. 49, 1879.
[6] Vierteljarhschft. für Derm. und Syph. 1877, p. 595.
[7] Lehrbuch der Hautkrankheiten, 1880.
[8] System der Hautkrankheiten, 1881; Ziemssen, Hautkrankheiten, 1883, p. 193.

that the papule of prurigo is nothing else than a kind of lichen pilaris, a thickening of the epidermis around the lanugo-hair, or around the openings of the sebaceous ducts. They do not have the slightest trace of an inflammatory infiltration, as they are of the colour of the skin. They remain papules, and never become vesicles or pustules, if they are not scratched or rubbed. He considers that, if the papule does not belong to an inflammatory process, which can be proven clinically and histologically (?), that if it is always in connection with a hair follicle, and if the clinical resemblance with lichen pilaris and cutis anserina is not forgotten, and, further, that if the itching cannot be explained as due to any inflammation, he is justified in formulating the following explanation: Prurigo is, like pruritus, a sensory neurosis of the skin. It differs from pruritus by the primary appearance of papules, which, just in the same manner as itching represents a sensory neurosis, represent themselves a contractile neurosis of the skin. This is explained anatomically by the hypertrophy of the smooth muscular fibres, and physiologically by the simultaneous appearance of cutis anserina, which last, due to the constant cramp of the muscles, produces a sort of tetanic contraction of the same.

Auspitz calls attention to the fact that he has frequently seen relapses of prurigo, in which there was no doubt about the diagnosis, and where there were all the symptoms of the disease, excepting the appearance of the papules, and he considers it an open question whether, in such cases, the proper diagnosis would be made in England or America, where it is supposed so be so rare. He does not think that the papular eruption plays in any way a more important part than the never-failing sensory neurosis, and so he considers the hypothesis that prurigo is really a combination of a sensory with a contractile neurosis, sufficient to explain its peculiar symptoms and its relation to pruritus cutaneus.

Kaposi[1] does not consider it possible to ascribe anything peculiar to prurigo microscopically after the consideration of his own and others' investigations. According to him, there is only a moderate infiltration with serous imbibition of the papillæ in the region of the papule, while the changes in the rete Malpighii are the same as in eczema papulosum. Where the disease has lasted for many years, there are the same changes as in chronic dermatitis and chronic eczema, *i. e.*, thickening; proliferation in the rete Malpighii; scattered pigment in the corium, with largely increased number of infiltration cells, especially marked around the vessels; here and there enlargement of the lymph spaces, as well as some of the sweat glands by proliferation of their cells, in some places bulging of the follicle, caused by the uneven growth of the sheaths; thickening of the M. arrectores, and, lastly, in old cases, atrophic degeneration of the follicles and sebaceous glands.

[1] Path. und. Ther. der Haut. 1883.

He does not consider that these anatomical changes explain the itching or the localization of the process. It may be, as Hebra says, that the former is caused by the fluid in the papule, but as such severe itching does not occur in other circumscribed exudations (herpes and erythema papulatum), the theory is not entirely satisfactory while the localization and the obstinate renewal of the papule is still unexplained. He does not consider the disease a neurosis like pruritus cutaneus, on account of the perceptible changes in the skin; for he considers it certain that all the symptoms of the disease go hand-in-hand with the increase or decrease of the papules. In pruritus cutaneus, no matter how long the duration of the disease, there are none of the signs of prurigo, there are no papules, and the localization is not the same.

Behrend[1] does not consider that the prurigo papule is always necessarily pierced by a hair, or that the position of the papule is in connection with the hair follicles. It holds a watery fluid and on this account he considers the papule owes its formation to an exudation. The itching is brought about by the irritation which this fluid exercises upon the sensory nerve endings in the skin, and he holds that it is a secondary symptom just as it is in urticaria, lichen ruber, etc.

He does not agree with Auspitz that it is a neurosis from clinical reasons. It would be difficult, he says, to explain why the nerves, which are found on the palm of the hand and soles of the feet, as well as those which regulate the skin on the flexor sides of the joints, always remain intact, and that in these places in the most inveterate cases there is no itching, being on this account never scratched. Further he does not consider that the papule is due to a tetanic contraction of the arrectores pilorum, for the same hypertrophic condition of the muscular fibres occurs, for instance, in elephantiasis arabum, without there being anywhere the appearance of cutis anserina.

In running over the opinions of those just cited, we see that they are divided into two sets, first those who consider the disease a neurosis, and second, those who do not. Those who consider it a neurosis (Willan, Cazenave, Batemen, Alibert, Fox, and Auspitz) lay little stress upon the pathological changes occurring in the papule, while those who do not consider it a neurosis (Derby, v. Baerensprung, Gay, Hebra, Duhring, Simon, Behrend, Neumann, and Kaposi) are divided into three groups. Derby considers the changes due to the hairs. Hebra thinks the first appearance of the papule is in the epidermis, while Gay and Neumann, etc., say it is in the papillæ.

The reason of the divergence of opinion about the pathology of the papule is due to the material used by the different investigators. One examined the skin from one stage of the disease, while the others took it from other stages; I shall return, however, to this question later on.

[1] Lehrb. der Hautk. 1883.

Having thus given a cursory description of the prurigo papule, according to the opinions of others, I shall now proceed to describe the result of my own investigations, and with the idea that the difference of opinion with regard to the papule was due to the fact that the disease had not been examined with sufficient care in its primary and later stages, I have tried, as far as possible, to obtain the papules from patients affected with the mildest form of the disease, as well as from those in whom it had made such progress that it appeared in its most intense form.

Material has been furnished from seven different patients, from whom twelve different pieces of skin have been excised *intra vitam*, care being taken to mark such papules as were most indistinct before excision with India ink, and this was done in order that there might be no doubt that the papule itself came under the field of the microscope. This was found to be especially necessary with papules which could only be felt, as the macroscopic changes in them were so slight that one could not be absolutely sure of the position which they held in the section. In order to give an idea of the different stages of the disease from which the skin was taken I shall give a general outline of the seven cases referred to. As, however, from these seven cases twelve different pieces of skin for examination were taken, I shall consider them as so many cases, it being my object not necessarily to take them from different persons, but from different stages of the disease. The incisions in the skin were made deep enough to include the corium, and in some cases part of the subcutaneous tissue. The places were chosen with great care by Prof. Pick, and the excisions made either by him, or under his supervision. With the proper regulation of the treatment, and by intermitting it as required, the prurigo papule can be obtained in its earliest and latest form, and while this method of procedure enables one to obtain a clear idea of the papule microscopically, it also assists in its closer clinical study, which has a direct bearing upon the history of the papule itself.

CASE I. F. K., aged 10, entered hospital for the first time on February 9th, 1883, affected with prurigo. The patient has been troubled with itching from the earliest infancy. Parents and other members of the family, consisting of four sisters and one brother, are all healthy. The eyes of the patient have been congested for several years; he also suffers from nasal catarrh.

Status præsens. The patient for his age is small, pale, and weak-looking. His skin is somewhat pigmented, which is most noticeable on the trunk and extremities, extensor sides. It is covered in the latter places with somewhat elevated papules, which have bloody crusts upon them, whereby the skin appears rough, uneven, dry, and thickened. The inguinal glands somewhat swollen, and the glands in other places more than usually prominent. Was treated with glycerine, amylum powder, and baths. After the skin had become soft and pliable, and the papules had all disappeared, a piece was excised on February 21st, from extensor side of the right humerus.

CASE II. M. M., aged 7, entered hospital for first time on January 12, 1883, affected with prurigo. Mother died at 36 of phthisis. Two other children at 8 and 11 years, respectively, are healthy. The present affection, according to statement, has existed since the second year of her life.

Status præsens. Patient for her age is weak and undeveloped. The skin, especially upon the extensor side of the extremities, rough, and covered with scarcely visible prurigo papules. The glands generally are swollen. Treated with baths, glycerine, and amylum powder, and sent out with a smooth skin on March 11th. Returned to hospital on the 19th with a well-marked prurigo eruption. On the 21st, before any treatment was undergone, a piece of skin containing two papules was excised from the extensor side of the humerus.

CASE III. W. K., aged 17, entered hospital for the first time January 9th, affected with prurigo agria and acute nephritis. The disease showed itself in his second year. It began upon the legs and spread gradually over the whole body. His glands have been swollen for a long time. Father of patient died of tuberculosis. The rest of the members of his family are healthy. The house in which the patient lives is damp, and for some time past he has been sleeping upon the floor. Patient coughs. Treated in usual way, and sent from hospital February 6th, with a smooth skin, and no albumen in urine. Returned to hospital March 26th, with a reappearance of the disease. Three days after his entrance, and before any treatment was undergone, a piece of skin, containing a prurigo papule, was excised from the calf of the left leg.

CASE IV. C. L., 12 years, entered hospital for the second time January 18th, affected with prurigo. There is no history showing that any other members of the family have this disease. The eruption is just beginning all over his body, but scattered here and there upon his hands and feet are seen a few vesicles. One of these was excised. From a papule upon his thigh, a hair was pulled out, great care being taken to bring with it as much of its sheath as was possible.

CASE V. Same as Case II. The patient, having been sent from the hospital, returned after a while with a reappearance of the disease, and before any treatment was undergone, a piece of skin containing a papule was excised from the extensor side of the left thigh on April 4th.

CASE VI. Same as Case IV. A piece of skin taken from the thigh. The eruption had become more prominent since the excision of the first piece, which occurred two days before, as the patient had been subjected to no treatment.

CASE VII. F. N., 11 years old, entered hospital for the first time February 8, 1883, suffering from prurigo. The patient is the only one of a family of eight children thus affected. From his infancy has been troubled with severe itching, which was especially bad upon his legs.

Status præsens. The patient looks pale, and is of small stature. The skin of the trunk is somewhat pigmented, and scattered here and there upon it are seen pin-head-sized papules covered with bloody crusts. These, including pustules, are present also in large numbers upon the extensor sides of the extremities. On the legs, in their whole circumference, there are large confluent pustules in some places forming ulcers. The glands are swollen everywhere. On April 12th, and while the disease was in a complete state of eruption, a papule was excised from the left arm.

CASE VIII. Same as Case III. A piece of skin containing a papule was excised from the extensor side of the thigh on April 19th, after a week's intermission of treatment, and when the eruption was just beginning to appear.

CASE IX. J. K., aged 26, entered hospital, where she had been treated many times before, on March 30th, affected with prurigo. The eruption extends over the whole body, and began with itching in her earliest infancy. Her menses have been regular since her 16th year. The patient is strong, well-built, and well-nourished. Her skin is pigmented and rough, especially so on the extensor sides of the extremities, which are covered with scratched and unscratched papules. Inguinal glands much swollen. Pediculi vestimentorum. After a long treatment with baths, solutio Vleminckx, etc., the papules all disappeared, and the skin remained simply pigmented and thickened. In this state a piece of skin was taken from the right thigh, extensor side, on May 1st.

CASE X. Same as Case II. After a period of treatment, during which the skin became apparently normal, the patient was left alone for a week, and just as a relapse was beginning, a prurigo papule, which could be more plainly felt than seen, was taken from the right thigh. It did not differ from the skin in colour, was very slightly raised, and had not been scratched. Before excision it was marked with India ink, and afterwards placed immediately in absolute alcohol.

CASE XI. W. M., aged 11 years, entered the hospital for the first time May 27, 1883, affected with prurigo. The disease has lasted a year and a half, and began, according to his statement, with the formation of papules. His parents, two brothers, and one sister are healthy.

Status præsens. Patient, for his age, is abnormally well developed, his skin is rough and pigmented upon the extensor sides of the extremities, where it is thickened and covered with papules, and shows, from the bloody-looking crusts which cover the various pustules and small ulcers, the extent to which scratching has been carried. The inguinal glands on both sides swollen to the size of a walnut. On the day following his entrance, and before treatment had begun, a piece of skin containing a papule was taken from the right arm above the elbow-joint. This papule had not been scratched, and although less prominent than any of the others, it could be plainly seen and felt. Before excision it was marked with India ink.

CASE XII. Same as Case I. After undergoing treatment for some time until the skin had become to all appearances normal, the patient was left alone for a few days and carefully watched, in order that a papule might be excised in its earliest stage. As soon as one was felt, and when it was not even visible to the unaided eye, it was marked with India ink and then excised.

The clinical histories of the cases have been given in the order in which the material was taken from the patients, but in making a histological description, I shall begin with that papule which appears in the earliest stage of the disease, and shall for this reason choose Case XII. as the first one to be described.

From Case XII., which had undergone treatment, and in which the disease was just beginning to reappear, a piece of skin 1 cm. long and $\frac{1}{2}$ cm. wide, was cut from the left thigh, extensor side. It contained one

papule which could be plainly felt as a body about the size of a millet-seed, but could not be seen without the aid of a magnifying glass, and this showed it to be slightly raised above the rest of the skin in the form of a rounded elevation. The other part of this piece of skin was soft and pliable like normal skin, and there were no appearances of its having been scratched, showing that no itching had previously existed. Before its excision the papule was marked with India ink, and the whole piece then hardened in alcohol. This piece of skin was cut into a series of thirty-six sections, the first one beginning at the edge of the papule. They were then stained in gentian violet and mounted according to their order in Canada balsam.

The microscope disclosed two hairs which pierced the papule in its centre, and near them, running to its surface, the duct of a sweat gland also. In the papillæ lying between the hairs is seen a slight amount of round-cell infiltration, which in those sections corresponding to the middle of the papule is most intense around the upper layer of vessels of the corium, or where the papillary vessels join them. The papillæ are somewhat elongated, and a few infiltration cells surround their vessels, the hair sheaths, and glandular duct. The M. arrectores are not hypertrophied, and there is a slight bulging of the whole portion of the skin which lies above the infiltration, and which includes ten or fifteen papillæ counted as they appear on the flat surface of the section. Both hair sheaths are slightly pouched and uneven, corresponding to the changes described by Derby, Gay, and Neumann, but the sebaceous and sweat glands are unaltered. The infiltration in this specimen, starting from the upper layer of vessels of the corium, extends upward as far as the rete Malpighii and there stops. The epidermis is not thicker above the infiltration than elsewhere in the section, and in it, quite unaltered, are seen the elongated cells of the first layer of the rete mucosum, the well-defined prickle-cells, the stratum granulosum, the stratum lucidum, and then the horny layer, to which the India ink clings, marking the exact position of the papule. In none of the sections is the slightest trace of a vesicle to be seen, or any of those small heaps of scaly epithelium which characterize the epidermis of the cases taken from a later stage of the disease.

The other portions of the skin, adjacent to the papule, have a few wandering cells scattered here and there around the vessels, but otherwise there is no change from the normal.

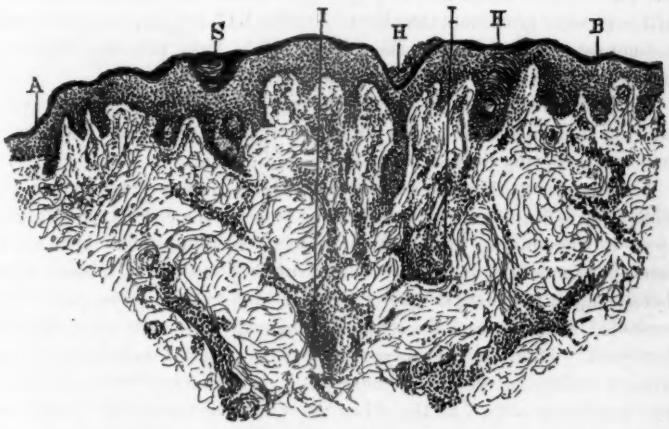
Fig. 1 shows well the microscopical changes, which consist, as has been described, simply in a small amount of round-cell infiltration.

From Case X., which was a little further advanced than the previous one, a piece of skin $\frac{1}{2}$ cm. wide and 1 cm. long, and containing a papule, plainly felt as a body somewhat larger than a millet seed, but which was scarcely visible, was cut from the extensor side of the right thigh, and the papule having been previously marked with India ink, the whole

piece was placed in alcohol. The adjacent skin was to all appearances normal, and had not been scratched.

This piece of skin was cut into a series of thirty sections, the first one being made at the edge of the papule, and after staining with gentian violet they were mounted according to their order in Canada balsam.

Fig. 1.



The papule lies between A and B. I. Infiltration. H. Hairs. S. Opening of a sweat duct. (Oc. 3; ob. 4. Reichert.)

As in Case XII. the infiltration was seen to be most intense around the upper layer of vessels of the corium, and where the papillary vessels joined them. From this point it runs up into the papillæ, stopping at the rete Malpighii. Three hairs pierce the papule, and there is a sweat-duct running through it. The infiltration surrounds the vessels lying between the hairs, but does not affect the sebaceous glands, which are quite unchanged. There is no appearance of hypertrophy in the M. arrectores, nor are the sudoriparous glands, the entire duct of one of which is seen passing through one section, altered in any way. The papule includes ten or fifteen papillæ which are more or less infiltrated and decidedly enlongated. The epidermis covering them is somewhat thicker than in other parts of the skin.

In running over this series the infiltration is seen surrounding the vessels, which run down between the hairs, and the hair sheaths appear somewhat pouched, as in Case XII. The skin adjacent to the papule is not altogether normal, for the vessels are slightly enlarged and there are a few wandering cells in their neighbourhood. The epidermis is generally thicker than is normal, but there are no appearances of a vesicle any-

where to be seen. The openings of the sweat-ducts are slighly dilated, and the connective tissue of the corium is only slightly irregular in that portion included within the papule.

From Case XI. which had reached the acme of the disease, a piece of skin about 1 cm. square, containing a papule slightly larger than the other two already described, and which could be plainly seen, was taken from the left arm, just above the elbow-joint. Before excision the papule was marked with India ink, and the whole piece then placed in alcohol. Although more prominent than those of Cases XII. and X., the papule itself had not been scratched, but the adjacent skin, from previous irritation, had become somewhat harder and thicker than normal.

This piece was cut into a series of twenty-four sections beginning at the edge of the papule, and after staining with gentian violet they were mounted according to their order in Canada balsam.

The changes in this case are similar to those in the previous one. The infiltration is seen to start from the same place in the corium, and extends upwards surrounding the papillary vessels. In this papule there are no hairs, but there is a sudoriparous duct running through it, around which there is also a moderate degree of small cell infiltration. The papillæ are somewhat elongated, and the stratum corneum covering the papule slightly thickened. There are two sweat-glands lying almost directly under the primary infiltration which are unaltered. Surrounding them are seen a few wandering cells. In the skin adjacent to the papule the vessels are slightly enlarged, and here and there a few infiltration cells are seen near them. There is nowhere any appearance of a commencing vesicle, or of the scattered heaps of epithelial cells to be noticed further on. The fibres of the connective tissue of the corium, with the exception of those included in the papule which are slightly irregular, are not altered.

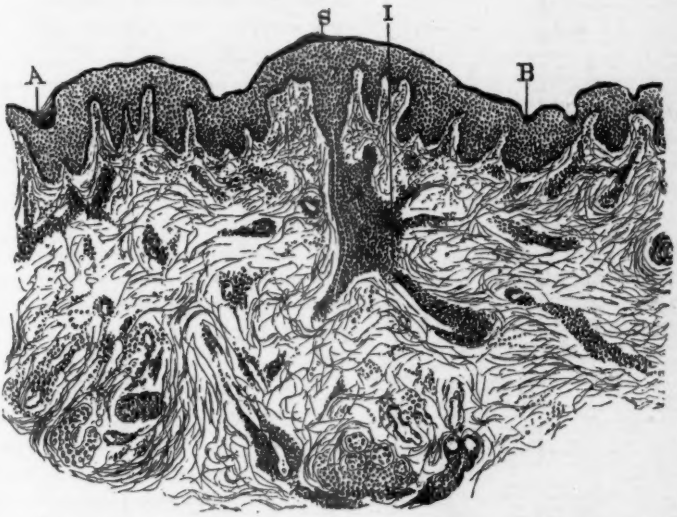
In the skin adjacent to the papule, the stratum corneum is somewhat thicker than normal, and there is a slight degree of infiltration scattered around the vessels of the papillæ and corium. (See Fig. 2.)

From Case II., which was at the acme of the disease, a piece of skin, $\frac{1}{2}$ cm. wide and $1\frac{1}{2}$ cm. long, and containing two papules, each about the size of the head of a pin, and which could be plainly felt and seen, was cut from the extensor side of the right humerus. There was no series made in this case, but the entire papules were included in the sections, and, after staining with carmine, Bismark brown, and gentian violet, they were all mounted, without however being arranged in any particular order. It required but little care to pick out the sections which came next to each other.

One of the papules is pierced by two hairs, which however run through its outer edge and not through its centre. There is a comparatively large amount of cell infiltration around the upper vessels of the corium and those running into the papillæ. This infiltration, independent of the hairs, and

not surrounding them, is seen to pass through the epidermis, between the layers of which a vesicle has formed, which also is not pierced by the hairs. This vesicle lies within the epidermis, between the stratum granulosum and stratum corneum, involving the former to a slight degree, and

Fig. 2.



The papule lies between A and B. I. Infiltration. S. Opening of sweat duct with gland underneath. (Oc. 3; ob. 4. Reichert.)

covering the middle portion of the papule. It is not more than half the circumference of the papule, for there are as many as fifteen papillæ included in the latter and only half that number are covered by the vesicle.

The vesicle is similar to those seen in other diseases (variola, herpes zoster, etc.), and its contents consist of the infiltration cells, which have come from the corium, with broken-down epithelium. This infiltration is seen passing through the different layers of the epidermis, and the cells can be followed into the vesicle itself. It is confined to that portion of the skin included in the papule, and does not extend downwards beyond the upper line of vessels running through the corium. The muscles are not hypertrophied, and the hair sheath is not altered.

The second papule, included within these sections, has the duct of a sweat gland running to the surface of the epidermis directly through its centre. The infiltration is seen to occupy the same place as in the first papule. It extends upwards, surrounding the sweat duct, passes through

the rete Malpighii, and between the same layers of the epidermis as in the one just described, and, surrounding the opening of the duct, a vesicle has formed, within which can be seen some of the infiltration cells. This vesicle is larger and more distinct than the former one, and its contents evidently more fluid than it, as the meshes are larger and the trabeculæ running across it longer. It does not, however, any more than the previous one, cover the whole surface occupied by the papule.

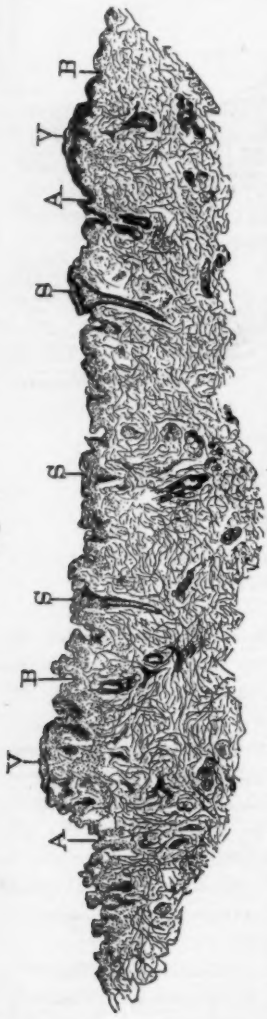


Fig. 3.

Two papules lie between A and B. V. Vesicles. S. Openings of sweat ducts with small masses of epithelium collected above them. (Oc. 3; ob. 1. Reichert.)

There are no hairs running through this papule, and the infiltration is confined to the upper portion of the corium, the papillæ, and epidermis. The latter is thickened where it covers the papillæ included within the papule.

In the adjacent skin there is a small amount of infiltration, surrounding sometimes the hair sheaths and sweat glands, but always surrounding the vessels. On the surface of the epidermis, surrounding the hair follicles and covering the openings of the sweat ducts, are seen in many parts of these sections a small collection of epithelial cells, which cling either to the hair or are attached to the ducts. They are simply scales of epithelium which have not fallen off. All along the lower layer of the rete Malpighii there is seen a marked increase in the amount of brown pigment contained within the cells. Itching had evidently been severe, as the macroscopic appearances of the skin showed, but the vesicles upon these papules were still intact.

In this case the papules were the direct result of the infiltration described, while all the other changes in the cutis and epidermis were secondary. (See Figs. 3 and 4.)

From Case III., which had reached the acme of the disease, a piece of skin, $\frac{1}{2}$ cm. square, was taken from the calf of the left leg. It contained

a papule the size of a pin head, which could be plainly felt and seen. A series of thirty sections was made, and they were mounted in regular

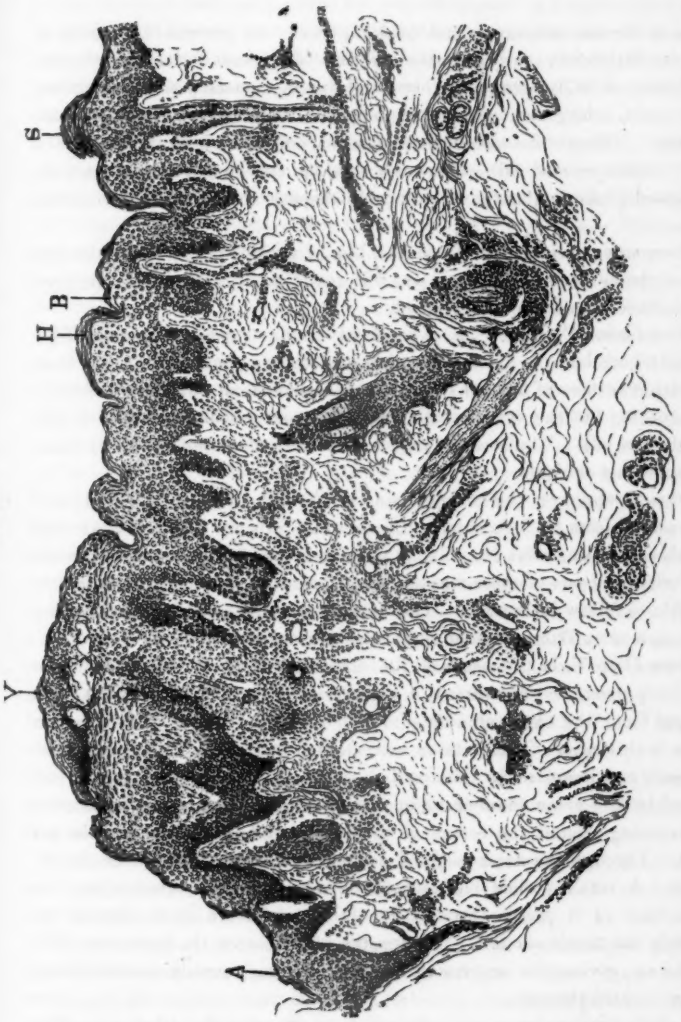


Fig. 4.

This figure represents one papule of Fig. 3 enlarged. The papule lies between A and B. V. Vesicle with infiltration underneath and a sweat duct running into it. Two hairs are seen, one with hypertrophied muscle, and both lying outside the infiltrated portion. S. Opening of sweat duct with small mass of epithelial cells. The same can be seen at H. H. Hair follicle. (Oc. 3; ob. 4. Reichert.)

order in Canada balsam after having been stained with gentian violet. The papule was pierced by a hair, and contained the duct of a sweat gland. All the sections presented the appearance so commonly seen in

chronic inflammations of the skin, and it was only from the greater thickness of the epidermis and the large amount of cell infiltration at one point in the sections, that the papule could be distinguished from the rest of the skin.

As in chronic dermatitis and eczema, there was general thickening of the rete Malpighii, increase in the quantity of pigment in its lower layers, collections of infiltration cells here and there, especially marked around the vessels, enlargement of the lymph spaces, with hypertrophy of the hair muscles. There were also seen at various points, as is so frequently the case even in normal skin, where the stratum corneum from any cause is thickened (lichen pilaris), curled up underneath the epidermis, encysted hairs.

There was no vesicle in this series, but at various points along the surface of the epidermis the same small heaps of scaly epithelium were seen which have already been described.

From Case IV. a piece of skin about $\frac{1}{2}$ cm. square, and containing a vesicle which had the appearance of belonging to a papule, was taken from the inside surface of the left foot. This piece was cut out so superficially that nothing but the vesicle itself with its upper and lower layers of epidermis was left. The sections made, therefore, could not have any bearing upon this subject.

From a papule on the extensor side of the left thigh, a hair was carefully pulled from its follicle with the epilation forceps. Almost the entire sheath came away with it. Under the microscope it was found to contain two hairs, and one of these was so much curled up that it was almost impossible to follow its course. The sebaceous gland filled with epithelium cells such as v. Baerensprung describes, was not found.

From Case V. in the acme of the disease, a piece of skin $\frac{1}{2}$ cm. wide and 1 cm. long, and containing a papule about the size of a millet seed, was cut from the extensor side of the left thigh. There was no series made in this case. The sections were stained in gentian violet and picrocarmine, and mounted in Canada balsam or glycerine. The papule was formed in the same manner as in the previous cases, by an infiltration commencing around the vessels of the corium and extending into the papillæ. Through the outer edge of one side runs the duct of the sweat-gland. A small vesicle has formed in the epidermis surrounding the sweat-duct as it passes through it. It is similar to those already described, but much smaller. Where the hairs pierce the epidermis it is pushed up, giving the impression that the stratum corneum resisted them as they passed through.

In these sections great care was taken to examine the substance called by Ranvier[1] eleidine, and for which the name of "kerato-hyaline" has been

[1] Sur une substance nouvelle de l'epiderme et sur le processus de keratisation du revêtement epidermique. Comptes rendus, 1879, t. 88, p. 1361.

proposed by Waldeyer,[1] for the purpose of comparing it with the amount contained in normal skin taken from the same situation.

It was found to be largely increased, but not to a greater extent than it was in other diseases in which the rete Malpighii and epidermis are infiltrated or thickened (molluscum contagiosum, pemphigus.) Where the epidermis was seen to be thickest, there the eleidine was increased proportionately, for instance, just underneath the vesicle and where the hairs passed through.

From Case VII. a piece of skin ½ cm. wide and 1 cm. long, containing a papule, was cut from the extensor side of the left humerus. This papule was pierced by a hair, but the infiltration was more intense around the vessels in its neighbourhood than around its sheath. There was general thickening of the epidermis, but especially in that portion covering the papule. In the adjacent portions of the skin, the changes were present which have been so often ascribed to chronic inflammations.

From Case I., which on account of treatment had no appearance of the disease, a piece of skin ½ cm. wide and 1½ cm. long, was cut from the extensor side of the right humerus. A small amount of cell infiltration is seen lying around the vessels of the corium and the papillæ. The latter are somewhat elongated, there is an increase in the amount of pigment bodies in the lower layer of the rete Malpighii, the epidermis is thickened, the openings of the ducts are dilated and are covered in many places with small collections of scaly epithelium. The hair sheaths are pouched at the insertion of the muscles, and in many places encysted hairs are curled up underneath the epidermis. The M. arrectores are hypertrophied.

These changes are spread evenly throughout the skin, and there is no evidence of a central infiltration, as in those cases where there is a papule.

From Case IX., which on account of treatment had no appearance of papules or of scratching, a piece of skin ½ cm. wide and nearly 2 cm. long, was cut from the extensor side of the right thigh. There was no series made with this piece. The sections were mounted in glycerine or Canada balsam, after staining with carmine, picro-carmine, Bismark brown, and gentian violet. They all contained evidences of chronic inflammation.

In those sections stained with picro-carmine the eleidine, as in Case V. was seen to be increased. There was general thickening of the epidermis, and in many places the hairs were encysted.

From Case V. a piece of skin 1 cm. square and containing a papule, was taken from the extensor side of the right thigh. There was no series made, and the sections were all placed either in chloride of gold, or hyperosmic acid, for the purpose of examining the nerve endings. Neither the tactile corpuscles nor the nerves themselves were seen to be altered.

[1] Utersuchungen über die Histogenese der Horngebilde insbesondere der Haare und Federn, 1881. Henle Celebration, Göttingen.

From Case VIII. a piece of skin about ½ cm. wide and 1 cm. long and containing a papule, was cut from the extensor side of the left thigh. The sections were all placed either in chloride of gold or hyperosmic acid. As in Case VI. no change was seen in the tactile corpuscles or the nerves themselves.

In making a summary of my own investigations, although acknowledging that I have found no changes which have not been described by others, excepting the eleidine, yet I am forced to draw rather different conclusions regarding the formation of the papules, when considering them in their earliest and latest stages.

I consider that the papule is formed by an infiltration beginning around the upper layer of vessels of the corium, and that this infiltration extending upward surrounds the papillary vessels, enlarges the papillæ, thus pushing up the epidermis, which becomes thickened at an early stage above them, and at last penetrating it, forms within its layers a small vesicle containing serum, blood, and lymph-cells. The signs of infiltration surrounding the hair sheaths and sweat-ducts are secondary, and they play no especial part in the process. Their presence in the papule is accidental, and it is certain that the primary changes in the skin are not in connection with them.

The colour of the papule at first does not differ from the rest of the surrounding skin, on account of the depth of the slight infiltration with which it begins. For the same reason, it is at first only felt, and not seen, as the infiltration has not extended high enough to push up the epidermis perceptibly, but is sufficiently great to give a feeling of knot-like hardness underneath it. I differ, therefore, entirely with Auspitz when he says that the papule does not belong to an inflammatory process. In fact, I consider the whole process due to an inflammation, and that all the signs of chronic dermatitis follow regularly, according to the length and duration of the disease, and the amount of scratching, which the itching, as a secondary symptom, causes.

Clinically the formation of the papule coincides with the foregoing description, for there is always noticed in the beginning of the disease, after careful investigation of the skin, a slight roughness, and a sensation as of running the hand or finger over small knots, covered with an intervening membrane. At this stage there is no itching. In fact, the itching does not begin until the infiltration has so far advanced that the papules are more distinct. If before this occurs the treatment is begun, no itching appears. This proves, as Kaposi says, that all the symptoms of the disease go hand in hand with the increase or decrease of the papules.

In looking over the work done by others, and comparing it with my own investigations, I find that they disagree more in the conclusions arrived at than in the general histological changes described.

I cannot agree with Hebra that the formation of the papule begins in

the layers of the epidermis, and that the itching is due to fluid contained within the vesicle; for, in those papules taken from the earliest state of the disease which I examined, there is no sign of a change in the epidermis. This is not affected until the infiltration has become more general, and in several cases the itching was present before a *vesicle was seen, macroscopically or microscopically.* Nor can I agree with Derby and Auspitz that the papule is always pierced by a hair, for, in several of the papules examined by me, there was no hair to be seen.

I must also disagree with v. Baerensprung, that they are due to a collection of epithelial cells within the openings of the sebaceous ducts; for this collection of epithelial cells does not occur until the stratum corneum is so affected that a proliferation of its cells takes place, causing an extra formation of scaly epithelium, which generally falls off, but which often clings to the hair-follicles and openings of the sweat-ducts in the form of small heaps. These masses have nothing to do with the papule, and may occur in any disease, causing chronic thickening of the epidermis.

The investigations of Neumann, Gay, and Simon coincide more nearly with my own, but I do not agree with them that the infiltration begins in the papillæ. These are affected later, and the part of the cutis, where the inflammation first occurs, is underneath them, around the vessels of the corium, and where they send off smaller branches to the papillæ.

If asked what was the cause of the inflammation starting the formation of the papule, I must honestly answer, I do not know. Auspitz is satisfied with the hypothesis, that it is an idio-neurosis, but his conclusions are drawn without a thorough consideration of the pathology of the papule. He takes it for granted there is no question of a primary inflammatory condition, a statement which is utterly at variance with my own microscopical investigations, and those of others. He seems to me to begin at the wrong end of the papule, for, as I have shown, the hypertrophy of the hair muscles does not occur any sooner in prurigo than in some other affections where there are no papules. As, however, they are not always in connection with a hair, it is not necessary to further argue this point.

Late investigations into the condition of the nerve endings in ichthyosis[1] and vitiligo[2] have shown them to be altered. Still the question immediately suggests itself whether these changes were not the result of disease rather than the cause. Would there not be changes in all parts of the skin, as the natural result of a chronic diseased condition? Some authors think that one proof of a disease having a nerve origin would be its production by the use of drugs known to affect them. The description by Charcot and Vulpian of a pruriginous eruption, produced by nitrate of

[1] Leloir, Alteration des nerfs cutanés dans un cas d'ichthyose congenitale. Comptes Rend., t. 89.

[2] Leloir et Chabrier, Alterations des nerfs dans un cas de vitiligo. Comptes Rend., t. 89.

silver, would carry much weight with it, if others had confirmed it, or had the symptoms coincided with those of prurigo, but as it stands it is unimportant, and proves nothing.

Until more thorough proof based upon careful pathological investigations is produced, I cannot look upon prurigo as a neurosis. The appearance of the papules, caused by a primary infiltration and inflammation before the itching, the peculiar localization of the disease, the negative effect produced by "nervines" therapeutically, the distinct and characteristic eruption which distinguishes it from other diseases, the fact that a simple itching (pruritus) never runs into it, speak altogether against this hypothesis.

The connection of many diseases of the skin with albuminuria has often been noticed, so that prurigo does not stand alone in this respect. Where they occur together, the albuminuria, as in the case related in this paper, generally disappears with the improvement in the prurigo symptoms. There are, however, so many cases of prurigo which have no connection with a disease of the kidneys, that the two occurring together is to be explained rather as an accident, than that they have any direct bearing upon each other.

Hebra and all other observers, except Klemm, consider the disease most frequent in ill-nourished and ill-cared-for people, but to explain a disease by saying it is due to a "bad state of the system" is illogical and unscientific, and therefore I must consider that the first cause which produces the inflammation in prurigo is still unexplained.

I cannot close this article without expressing my warmest thanks both to Professor Chiari and to Professor Pick for the kind assistance which they have rendered me while investigating this subject, and for the friendly interest which they have manifested in all my work during my stay in Prague.

PRAGUE, June 22, 1883.

ARTICLE III.

EXCISIONS OF THE TARSUS, WITH A REPORT OF TWO SUCCESSFUL REMOVALS OF THE ENTIRE TARSUS.

By P. S. CONNER, M.D., Prof. of Anatomy and Clinical Surgery, Medical College of Ohio, etc.[1]

ADMIRABLY adapted as is the foot to sustain weight, diffuse force, and secure ease and quickness of movement, it is, in its proximal half at least, peculiarly liable to disease and the extension of inflammation from part to part. Placed where it must, of necessity, be subjected to violent jars and

[1] A paper read before the American Surgical Association, at its meeting at Cincinnati, Ohio, June 1, 1883.

severe twists, every opportunity is afforded for the occurrence of limited blood-extravasations in its bones, and of traumatic synovitis in its joints.

Its skeleton is made up almost entirely of cancellous tissue, covered in by closely adherent periosteum, that blends so intimately with the ligaments of the numerous articulations that it may, surgically considered, be regarded as a single sheet inclosing the whole tarsus.

It is crossed by numerous tendons and overlain by a definite though not very thick sheet of connective tissue, so that thecal and fascial inflammations may readily, by contiguity, be carried over to it.

In those who, by possession of the *ignotum quid*, are predisposed to the so-called strumous affections, the frequently occurring, usually slight, traumatisms may readily be followed by simple inflammation, or by the deposit of tubercle in the bones, the synovial membranes, or the peri-articular structures.

Specific periostitis or gumma may be here located, to produce the same effects as elsewhere. Lastly, external violence, contusions, cuts, compound fractures (gunshot or other), may be the developing cause of caries or necrosis.

Little wonder is it then, that tarsal disease is of frequent occurrence, or that it is at times found to affect a large portion or the whole of this section of the foot.

When thus extensive, what shall be done for its relief? Rest, compression, and stimulating or sedative applications (always proper in the beginning, and at times securing the best of results) are very likely to fail in arresting the progress of the disease, which more or less rapidly goes on to the destruction of the part.

When such has been produced, when the peri-articular structures are greatly thickened, abscesses have formed, and numerous sinuses exist leading down to dead bone, surgical interference is limited to: 1. The opening of the abscess cavity, and the informal removal of carious or necrosed tissue, with or without deep cauterizations or such local stimulant applications as shall tend to secure more healthy and reparative action; 2. Amputation, usually at or above the ankle-joint; and, 3. The methodical excision of such and so many of the tarsal bones as are unhealthy.

The first method in one form or another has long been employed, and in the less severe cases may be expected to often, perhaps generally, result favourably.

It is under this head that we must place the use of the actual cautery, so highly commended by Ollier and others of the French surgeons; the *évidement* of Sedillot; and the gouging and oakum-seton method of our distinguished Fellow, Dr. Sayre.

By surgeons generally, amputation through the leg or at the ankle has been and still is regarded as much to be preferred to any more conservative treatment.

Such operation, it is claimed, is less likely to be followed by death from septic infection, or as the result of protracted and profuse suppuration; and leaves the patient in a better local condition, more able by the aid of an artificial limb to move about and earn a livelihood.

But there have been reported from time to time, especially during the last twenty years, cases of extensive formal excisions, the history and end-results of which compel a reconsideration of the alleged dangers and disadvantages attending an attempt to remove the diseased and preserve the healthy part of the foot.

Such attempt, it has been held, may cause death, at first or later; will very likely be followed by a return of the disease in the parts left; and even if successful as respects life, must leave a useless foot, if not one actually an incumbrance.

Before proceeding to determine, if possible, the correctness or incorrectness of these views by an analysis of the 108 excisions of two or more bones which I have been able to collect, permit me to briefly report two cases in each of which removal of the entire tarsus was recovered from, and a very serviceable foot secured.

CASE I.—A. S., Alsatian, æt. 39. First seen July 18, 1875. For about two years had had disease of the right tarsus, following, as claimed, a slight injury upon the outer side of the foot.

General condition bad, consequent upon suffering and profuse suppuration and a very recent attack of erysipelas extending up to the middle of the thigh. The posterior half of the foot was much enlarged, and through four openings over the ankle and heel the probe could be readily passed into carious bone.

Excision being determined upon, on the following day, July 19, 1875, the entire tarsus, every bone of which was more or less diseased, was removed through an external lateral incision, extending back to the outer border of the tendo Achillis. The upper articular surface of the astragalus, though healthy, was taken away with the rest of the bone, but the malleoli were left untouched. The resulting cavity was lightly packed with carbolized oakum, and the limb placed in a fracture-box.

A high temperature (105° F.) was noted at the end of the first twenty-four hours; but thirty-six hours later, Dr. Schwagmeyer, who had the immediate care of the case, reported to me: "Patient quite comfortable, very little fever, more appetite, tongue moist, complains of but little pain, has had several hours quiet sleep." From this time on, the progress toward recovery was steady, and in a little less than two months the wound was entirely closed.

It is, perhaps, a significant fact, with reference to the cause of the tarsal disease, that just before this complete cicatrization occurred, the man had quite a severe acute periostitis of the *left* tibia in its upper third, which soon disappeared under the administration of full doses of the iodide of potassium.

This case, so far as I have been able to ascertain, was the first in which the entire tarsus was taken away.

In Jaesche's case, which was reported nine years previously, there was left of the os calcis, "the posterior part of the crust in form of half an egg-shell," to which the tendo Achillis was attached.

At the present time the man (not using even a cane) walks firmly and rapidly without limp, and can easily and quickly go up and down stairs, or climb up on to his wagon-seat. There is a half-inch shortening of the leg; the lateral movements of the foot are slightly limited; and the range of flexion and extension of foot on leg is lessened about one-fourth. The sole is flattened, but there is no lateral deviation of the foot or elevation of border. No re-formation of bone seems to have taken place. The foot is three inches shorter than its fellow (7 in.—10 in.); the circumference at instep level is one-fourth inch greater (9 in.—8¾ in.); measured over the heel and just below the malleoli the circumference is one-fourth inch less (11¾ in.—12 in.).

CASE II.—E. S., æt. 20, German. First seen in Cincinnati Hospital April 1, 1876. Had had for over two years disease of the right tarsus. Had already been twice operated upon by Dr. B. F. Miller, the "scaphoid and most of the astragalus" having been taken away in April, 1875, and three and a half months later "some small pieces of necrosed bone and a part of the os calcis." Examination of the foot showing that much, if not all, of what remained of the tarsus was carious, on the 8th of April I removed the whole of it through an external lateral incision.

The after-treatment was similar to that of Case I. As in that case there was an early rise of temperature (103° F.) at the end of the first twenty-four hours, with quick decline. Healing went on steadily, but slowly, and it was nearly six months before the man was able to readily move about without crutches.

Seven and a half months after the operation he could walk very well, and was doing duty as a nurse in the hospital ward. He now walks with ease and quite rapidly; never uses a cane; can run up and down stairs; and says that, so far as he can tell, the ankle movements are as good as ever. Their range does not seem to be any less than that of the sound ankle. Lateral movement is a little restricted. Owing undoubtedly to too great use of the foot soon after passing from under my observation, the leg bones have been crowded downwards and inwards; but no elevation of the outer border of the foot has taken place. The leg is shortened three-fourths of an inch, and the foot two and a half inches (7 in.—9½ in.). The instep circumference is one and a quarter inch less (7¼ in.—8½ in.); that over heel and below the malleoli two inches less (9½ in.—11½ in.); that at level of base of toes one inch less (7¼ in.—8¼ in.) than the like measurements of the left foot.

Satisfactory as has been the end-result in each of these two excisions, has it been merely surgical good fortune, or have we a reasonable prospect of securing the like in similar conditions of the foot? Though the number of operations tabulated is limited, it is yet, I believe, sufficiently large to warrant the deducing therefrom of certain general conclusions; especially since they have been made by many operators in various places and under diverse conditions, as respects time, age, and personal character.

Excision of entire Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
1	Conner	.....	M.	39	1875	Caries	Entire tarsus.	R.	Very good	.....	½ in. shortening of leg, 3 in. shortening of foot.
2	Conner	.....	M.	20	1876	Caries	Entire tarsus.	R.	Very good	.....	¾ in. shortening of leg, 2½ in. shortening of foot.
3	Jones, H. M.	London Lancet, July 2, 1881.	F.	Youthful.	1878	Caries	Entire tarsus.	R.	Very good	.....	Malleoli removed. "Appears to be a new osseous growth."

Total number of cases, 3. Recoveries: very good, 3.

Excision of nearly the entire Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
4	Jaesche	Langenbeck's Archiv f. Klin. Chirg. B. 8, 162. 1866.	M.	22	186-	Caries	Entire tarsus with the exception of posterior-inferior part of os calcis—base of 2d metatarsal.	D.	....	Pyæmia on 18th day.	
5	Cheever	Boston City Hosp. Reports, 3d series, p. 285.	F.	5	1875	Caries	Entire tarsus with the exception of astragalus.	R.	Very good	.....	"Left the hospital in about 4 months, walking well."
6	Kappeler	Deutsche Zeitschr. f. Chirurg. 1880, p. 432 *et seq.*	F.	19	1875	Caries	Entire tarsus with the exception of the posterior part of os calcis.	R.	Very good		
7	Kappeler	Op. cit.	F.	26	1877	Caries	Entire tarsus with the exception of one-half of the os calcis. Articular end of tibia and of fibula.	R.	Fair	.....	2½ years later had 20° active and 30° passive movement of ankle. Toes freely movable, and properly placed. Still used crutch in walking.

Total number of cases, 4. Recoveries; very good, 2; fair, 1 = 3. Deaths, 1.

Excision of nearly the entire Tarsus with Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
8	Conner	Amer. Journal Medical Sciences, July, 1875.	M.	33	1874	Caries	Entire tarsus with the exception of part of os calcis and part of astragalus. Entire metatarsus.	R.	Very good	.....	Died eight years later of typhoid fever.

Total number of cases, 1. Recoveries; very good, 1.

Excision of nearly the entire Tarsus with part of Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
9	Kappeler	Op. cit.	F.	46	1877	Caries	Entire tarsus with the exception of part of os calcis. Fifth metatarsal bone.	R.	Fair	.....	"With the aid of a cane walks very well." Osteitis in other foot.

Total number of cases, 1. Recoveries: fair, 1.

Excision of Posterior Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Life.	Usefulness of foot.	Cause of death.	Remarks.
10	Wakley	London Lancet, July 1, 1848.	M.	23	1847	Caries	Posterior tarsus with the malleoli.	R.	Very good	.....	Healed in four weeks.
11	Ring	Hancock, Anatomy and Surgery of Human Foot, p. 431.	F.	13	1855	Caries	Posterior tarsus.	R.	Good		
12	Heyfelder, J. F.	Heyfelder's Table.	M.	17	1858	Caries	Posterior tarsus.	R.	Failure	.....	Amputation on 24th day.
13	Cabot	Records Med. Imp. Soc. (Boston), v. 4, p. 65.	M.	Adult	1859	Necrosis	Posterior tarsus.	..	Uncertain	.....	At time of report "patient was doing well."
14	Whitehill, J. C.	Med. and Surg. Hist. War of Rebel'n. Surg. Vol. part 3, p. 592.	M.	26	1863	Gunshot wound	Posterior tarsus.	R.	Good	.....	Eighteen years later the limb was shortened 2½ inches.
15	Morton, Thos. G.	Amer. Journ. Med. Sci., April, 1871, p. 424.	M.	13	1869	Caries	Posterior tarsus.	R.	Very good	.....	"Very perfect recovery" as respects motion and usefulness. About 1 inch shortening.
16	Humphry, F. A.	St. Barth. Hosp. Rep., vol. x. p. 377.	M.	9	1874	Caries	Posterior tarsus.	R.	Very good	.....	"With a high-heeled boot he can, with a slight limp, walk well, and without a stick." 1½ inch shortening of leg.
17	Tiling	Med. & Surg. Hist. War Rebel'n. Surg. Vol. part 3, p. 611.	M.	28	1876	Gunshot wound	Posterior tarsus.	D.	....	Gangrene—on 10th day.	Amputation on 5th day.

Total number of cases, 8. Recoveries: very good, 3; good, 2; uncertain, 1; failure, 1 = 7. Deaths, 1.

Excision of part of Posterior Tarsus with Ankle-joint.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Life.	Usefulness of foot.	Cause of death.	Remarks.
18	Schüller	Deutsche Zeitschrift f. Chirurg. 1878, p. 303, *et seq.*	M.	10	1876	Caries	Ankle-joint with greater part of astragalus and of os calcis.	R.	Very good	.....	Same patient: operation on one side in September, on the other in November. Fifteen months later patient walked about 7½ miles without difficulty.
19	Hueter	Deutsche Zeitschrift f. Chirurg. 1878, p. 303 *et seq.*	M.	10	1876	Caries	Ankle-joint with greater part of astragalus and of os calcis.	R.	Very good		

Total number of cases, 2. Recoveries: very good, 2.

Excision of Posterior Tarsus with part of Anterior Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
20	Teale	Med. Times and Gaz., May 27, 1854.	M.	24	1853	Caries	Posterior tarsus and cuboid.	R.	Fair	.....	"Walked about with the assistance of a stick." Ankle motions good at expiration of ten months.
21	Teale	Med. Times and Gaz., Oct. 13, 1855, and Hancock, op. cit. p. 433.	F.	24	1855	Caries	Posterior tarsus, cuboid, and scaphoid.	R.	Very good	.....	Could do servant's work after six months. Could walk without stick.
22	Swain	British Med. Journ., Jan. 7, 1871.	M.	11	1864	Caries	Ankle-joint, posterior tarsus, and part of scaphoid and of cuneiforms.	R.	Very good	.....	Foot "well nourished and quite painless." 1¼ inch shortening. "Can walk any reasonable distance without distress."
23	Lehman	Deutsche Klinik, 1870, p. 10.	M.	40	1867	Caries	Ankle-joint, posterior tarsus, and scaphoid.	R.	Very good	.....	After ten months patient was completely satisfied with the condition of his foot.
24	Fayrer	Med. Times and Gaz., July 31, 1869.	M	9	1869	Caries	Posterior tarsus and scaphoid.	R.	Uncertain	.....	At time of report could put foot on the floor, and bear considerable weight upon it. "In fair way to make excellent recovery."
25	Goltdammer	Berl. Klin. Wochensch. 1871. 8, p. 151.	M.	Adult	1870	Gunshot wound	Posterior tarsus and scaphoid.	R.	Good		
26	Krohn	Kappeler's Table.	M.	10	1871	.....	Posterior tarsus and internal malleolus.	R.	Good	.....	Subperiosteal resection. Extensive reformation of bone. Some limp in walking No pain.
27	Kappeler	Op. cit.	M.	8	1879	Caries	Posterior tarsus, scaphoid, and part of cuboid.	D.	....	Amyloid disease of liver and spleen.	Lived three months.
28	Mikulicz	Langenbeck's Archiv f. Klin Chir., B. 20, 1881, S. 494 *et seq.*	M.	23	1880	Syphilitic ulcerat'n of soft parts of heel.	Ankle-joint, posterior tarsus, and proximal half of scaphoid and cuboid.	R.	Very good	.....	Osteoplastic resection. After fourth month could walk without shoe, and bear the entire weight of body on foot.
29	Conner	.....	M.	52	1882	Necrosis	Posterior tarsus and part of cuboid.	D.	....	Amyloid disease of intestines	Lived three months.

Total number of cases, 10. Recoveries: very good, 4; good, 2; fair, 1; uncertain, 1 = 8. Deaths, 2.

Excision of part of Posterior Tarsus with part of Anterior Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
30	Durand	Heyfelder's Table.	M.	14	1745	Caries	Astragalus, part of os calcis, cuboid.	R.	Very good	.....	Afterwards served as a soldier for thirteen years.
31	Liston	Edinb. Med. Journ., Jan. 1821.	F.	12	1818	.....	End of tibia, astragalus, scaphoid, and two cuneiforms.	R.	Good	.....	"Complete and lasting cure without much deformity or lameness."
32	Liston	Blackmann's Mott's Velpeau, v. 2, p. 483.	..	....	1832	.....	A part of the astragalus, scaphoid, and two cuneiforms.	R.	Failure	.....	"Did not succeed."
33	Jaeger	Heyfelder's Table.	..	....	1832	Caries	Astragalus and scaphoid.	R.	Uncertain		
34	Robert	Vierteljahrschrift f. d. Praktische Heilkunde, 1855, B. 3, p. 1, *et seq.*	F.	34	1851	Caries	Os calcis and cuboid.	R.	Very good	.....	Relapse 1½ years later. Death from phthisis.
35	Textor	Heyfelder's Table.	M.	23	1852	Caries	Ankle-joint, astragalus, part of os calcis, scaphoid.	R.	Very good		
36	Robert	Op. cit.	M.	58	1852	Caries	Anterior half of os calcis, cuboid, and scaphoid.	R.	Good		
37	Robert	Op. cit.	F.	35	1853	Caries	Anterior half of os calcis, greater part of cuboid.	R.	Good	.....	"Useful foot."
38	Cotton	Med. Times and Gaz., June 16, 1855.	M.	30	1855	Caries	Ankle-joint, astragalus, part of os calcis, of scaphoid, and of the three cuneiforms.	R.	Fair	.....	Recovery in ten weeks.
39	Cock	Med. Times and Gaz., Feb. 21, 1857.	F.	21	1856	Caries	Part of astragalus and of os calcis with scaphoid, cuboid, and one cuneiform.	R.	Failure	.....	At time of report, some dead bone remaining, and foot much misshapen.
40	Bradford, J. T.	Gross' "Surgery," vol. ii. p. 1087.	M.	15	1857	Caries	Os calcis, small part of astragalus and cuboid.	R.	Very good	.....	"Excellent recovery."
41	Heusser	Deutsche Klinik, 1860.	..	....	1860	Caries	Os calcis, scaphoid, and first cuneiform.	R.	Failure	.....	Subsequent amputation.
42	Humphry, G. M.	Med. Times and Gaz., April 27, 1861.	M.	12	1860	Caries	Ankle-joint, astragalus, and scaphoid.	R.	Failure	.....	Subsequent amputation.
43	Langenbeck	Vincent, Thèse de Paris, 1876, p. 73.	F.	11	1861	Caries	Os calcis, cuboid, part of astragalus.	R.	Very good	.....	Complete regeneration of bone.
44	Billings	Med. & Surg. Hist. War Reb. Surg. Vol. part 3, p. 658.	M.	52	1862	Incised wound	External malleolus, astragalus, and part of scaphoid.	R.	Fair	.....	"Could walk with aid of cane."
45	Gant	London Lancet, July 23, 1864.	M.	60	1862	Caries	Os calcis, cuboid, and part of third cuneiform.	R.	Very good	.....	"Ultimately walked without crutch or cane, and had a sound and useful foot."
46	Holmes, T.	London Lancet, May 27, 1865, p. 560.	F.	10	1863	Caries	Astragalus and scaphoid.	R.	Very good	.....	"Can walk perfectly, limp hardly perceptible."

Excision of part of Posterior Tarsus with part of Anterior Tarsus.—Continued.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to		Cause of death.	Remarks.
								Life.	Usefulness of foot.		
47	Humphry, G. M.	London Lancet, Aug. 6, 1864	M.	Youthful	1864	Caries	Part of astragalus, part of os calcis, part of cuboid, part of first cuneiform, with whole of scaphoid	R.	Very good	.....	Four years later could run about as though nothing had happened.
48	Humphry, G. M.	London Lancet, Aug. 6, 1864.	..	....	....	.....	Ankle-joint, astragalus, and scaphoid.	R.	Failure	.....	Subsequent amputation.
49	Simon	Kappeler's Table.	..	....	1866	.....	Ankle-joint, astragalus, anterior part of os calcis, scaphoid, and cuboid.	R.	Good	.....	"Happy result."
50	Mulvany	London Lancet, Nov. 6, 1869.	M.	29	1866	Caries	Ankle-joint, astragalus, ½ of os calcis, ⅔ of scaphoid.	R.	Very good		
51	Sayre	Bellevue Hosp. Reports, 1870, p. 116.	M.	27	1868	Caries	Part of astragalus, great part of os calcis, scaphoid and other bones.	R.	Very good	.....	"Walks without limping."
52	Jayaker	Med. Times and Gaz., Oct. 30, 1869.	M.	30	1869	Caries	Part of astragalus, scaphoid, and two cuneiforms.	R.	Good	.....	Sound and useful limb.
53	Langenbeck	Langenbeck's Archiv f. Klin. Chir., B. 16, 2, p. 246.	M.	Adult	1870	Gunshot wound	Ankle-joint, astragalus, part of os calcis, cuboid.	R.	Very good	.....	"Walks for hours without limping." Anchylosis.
54	Walter, A. G.	Culbertson's Table.	F.	10	1870	Caries	Ankle-joint, astragalus, almost all of the os calcis, scaphoid, part of cuboid.	R.	Very good	.....	Foot "useful to the fullest extent." Less than one inch shortening.
55	Walter, A. G.	Culbertson's Table.	F.	43	1872	Caries	Greater part of astragalus and of os calcis, part of cuboid and of scaphoid.	R.	Very good	.....	"Perfect usefulness of the joint and foot."
56	Levis	Phil. Med. Times, vol. iv. p. 310.	M.	17	1873	Caries	Ankle-joint, astragalus, part of scaphoid and of cuboid.	R.	Uncertain	.....	Seven months after the operation patient was "able to bear some weight on the foot;" was using crutches.
57	Nicholls	Holmes's "System of Surg." Am. ed., vol. iii. p. 236.	..	....	....	.....	Almost the entire astragalus, os calcis, part of scaphoid.	R.	Very good	.....	Two operations. "Patient can walk quite well, and with a hardly perceptible limp."
58	Homans, C. D.	Med. News (Phila.), Feb. 24, 1883.	F.	20	1882	Caries	Astragalus, nearly the whole of os calcis, nearly all the tarsal bones.	R.	Failure	.....	Amputation two months later, though healing was progressing favourably.

Total number of cases, 29. Recoveries: very good, 14; good, 5; fair, 2; failures, 6; uncertain, 2 = 29.

Excision of part of Posterior Tarsus with Anterior Tarsus and part of Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
59	Dunn	Med. Chir. Trans., vol. xi. p. 357.	M.	14	1816	Caries	Very small part of astragalus, anterior tarsus, bases of 2d and 3d metatarsals.	R.	Very good	.....	Bones removed at two operations. 4 years later 1½ inch shortening. In less than a year after the operation the boy walked 9 miles in one day.
60	Lauenstein	Proceedings of 12th Congress of German Surgeons.	F.	54	1881	Caries	Part of os calcis, anterior tarsus, bases of 4th and 5th metatarsals.	R.	Very good	.....	Almost imperceptible limp; ½ inch shortening of foot. Some reproduction of bone.

Total number of cases, 2. Recoveries: very good, 2.

Excision of part of Posterior Tarsus, part of Anterior Tarsus, and part of Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
61	Moreau, Sr.	Moreau, Resection des Os, p. 110.	M.	40	1788	Caries	Part of os calcis, cuboid, 3d cuneiform, and part of 4th and 5th metatarsals.	R.	Very good	.....	"Perfect cure."
62	Beck	Langenbeck's Archiv f. Klin. Chir., B. 5, p. 238.	M.	17	1864	Caries	Os calcis, cuboid, and two metatarsals.	R.	Very good	.....	Could do mountain climbing "without inconvenience."
63	Czerny	Volkmann's Klin. Vortr. No. 76.	M.	17	1874	Caries	Os calcis, cuboid, bases of 4th and 5th metatarsals.	R.	Uncertain	.....	Under treatment at time of report.

Total number of cases, 3. Recoveries: very good, 2; uncertain, 1 = 3.

Excision of Anterior Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
64	de Housse	Thomas. Thèse de Paris, 1853, No. 253.	M.	36	1775	Caries	Anterior tarsus.	R.	Very good	.....	Healed in two months; regeneration of bone. Walked "six leagues a day without aid and without fatigue." Two operations.
65	Jaesche	Langenbeck's Arch. f. Klin. Chir., 1866, B. 8, p. 162.	M.	51	1863	Caries	Anterior tarsus.	D.	....	Cirrhosis of liver and pericarditis	Two operations. Lived 14 months.
66	Bryant	"Surgery," p. 882. 3d Amer. ed.	M.	8	....	.....	Anterior tarsus.	R.	Very good	.....	"Excellent foot."
67	Socin	Deutsche Zeitschr. f. Chir., 1879, p. 350 *et seq.*	M.	15	1879	Caries	Anterior tarsus.	R.	Good	.....	Healed after ten months.

Total number of cases, 4. Recoveries: very good, 2; good, 1; death, 1 = 4.

Excision of Anterior Tarsus with Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
68	Conner	Amer. Journ. Med. Sci., July, 1875.	M.	31	1874	Caries	Anterior tarsus, entire metatarsus, except small part of 1st metatarsal.	D.	....	Pyæmia	Two operations sixteen days apart. Lived eleven days after second operation.
							Total number of cases, 1. Deaths, 1.				

Excision of part of Anterior Tarsus with Metatarsus.

69	Kappeler	Op. cit.	F.	26	1868	Caries	Cuboid, 3 cuneiforms, and all the metatarsals.	R.	Very good		
							Total number of cases, 1. Recoveries: very good, 1.				

Excision of Anterior Tarsus with part of Metatarsus.

70	Moreau, Jr.	Blackman's Mott's Velpeau, 2, 483.	..	....	....	.....	Anterior tarsus, bases of 3d, 4th, and 5th metatarsals.	R.	Failure	.....	Caries reappeared in other bones before cicatrization took place.
71	Champion	Mousau, Thèse de Strasbourg, 1863, 2d ser., No. 718.	..	....	1839	Caries	Anterior tarsus, with bases of 3d, 4th, and 5th metatarsals.	R.	Failure	.....	Caries reappeared "in other bones of the foot before cicatrization took place."
72	Laugier	Thomas, Thèse de Paris, 1853, p. 253.	F.	47	1853	Caries	Anterior tarsus, bases of 2d, 3d, and 4th metatarsals.	D.	....	Phthisis 1 month later	"Examination of the uncicatrized foot showed that the ultimate result would doubtless have been satisfactory."
73	Bigelow, H. J.	Records Med. Imp Soc. (Boston), v. ii. p. 342.	M.	44	1855	.....	Anterior tarsus, with bases 2d and 3d metatarsals.	D.	....	Exhaustion and tuberculosis	Lived 4½ months. "Health improved for 3 months, when his mind suddenly gave way; tendency to diarrhœa supervened, and he died of tuberculous disease."
74	Watson, P. H.	Edinb. Med. Journ., May, 1874.	M.	19	1870	Caries	Anterior tarsus, with bases of metatarsals.	R.	Very good	.....	"Walked almost without defect."
75	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good		
76	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good		
77	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good		
78	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good		

Excision of Anterior Tarsus with part of Metatarsus.—Continued.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
79	Watson, P. H.	Edinb. Med. Journ., May, 1874.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Failure	.....	Subsequent amputation.
80	Bruns	Langenbeck's Archiv f. Klin. Chir., B. 19. s. 658.	F.	36	1874	Caries	Anterior tarsus, with bases of metatarsals.	R.	Uncertain	.....	Discharged in 7 weeks. "Steps on foot without difficulty."
81	Dawson	Cincinnati Clinic, Jan. 1, 1876.	F.	6	1874	Caries	Anterior tarsus, with bases of metatarsals.	R.	Very good		
82	Watson, P. H.	Edinb. Med. Journal, April, 1875.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	..	....	.....	Result not stated. Subperiosteal operation.
83	Socin	Loc. cit.	F.	9	1879	Caries	Anterior tarsus, with bases of metatarsals.	R.	Uncertain	.....	Wound firmly healed. Died of typhoid fever 6 months after the operation.

Total number of cases, 14. Recoveries: very good, 2; good, 4; failures, 3; uncertain, 2 = 11. Deaths, 2; result unknown, 1.

Excision of part of Anterior Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
84	Meyer	Heyfelder's Table.	F.	37	1845	Caries	Scaphoid, 1st and 2d cuneiforms.	R.	Uncertain	.....	"Partial success."
85	Rayner	Hancock, Anat. and Surg. Human Foot, p. 439.	M.	16	1845	Caries	3 cuneiforms.	R.	Uncertain	.....	"Partially successful, but the patient died some months afterwards of disease of his lungs."
86	Skey	London Lancet, May 28, 1859.	M.	18	1858 } 1859 }	Necrosis	Greater part of the second row of tarsal bones.	R.	Uncertain	.....	Two operations.
87	Bryant	"Surgery," p. 982, 3d Am. ed.	..	....	....	.....	Cuboid, and three cuneiforms.	R.	Very good	.....	"Excellent foot."
88	Ownes	Culbertson's Table.	M.	56	1867	Necrosis	Cuboid, external and middle cuneiforms.	R.	Good	.....	"Good use of limb and foot."
89	Bruns	Langenbeck's Archiv f. Klin. Chir., B. 19, 658.	M.	17	1875	Caries	Cuboid and 3d cuneiform	D.	....	Amyloid disease of kidneys, spleen, and intestines	Died in ten days.
90	Socin	Loc. cit.	F.	27	1875	Caries	Scaphoid and 2 cuneiforms.	R.	Good	.....	After several years complete healing.
91	Hueter	Deutsche Zeitschr. f. Chir., 1878, p. 303 *et seq.*	M.	26	1876	Caries	Cuneiform bones and part of cuboid.	R.	Fair	.....	Discharged well in 2½ months. Walked with cane. Regeneration of bone.

Total number of cases, 8. Recoveries: very good, 1; good, 2; fair 1; uncertain, 3 = 7. Deaths, 1.

Excision of part of Anterior Tarsus with part of Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
92	de la Motte	Mousau, Thèse de Strasbourg, 1863, 2d ser., No. 718.	..	....	....	Necrosis	2d and 3d cuneiforms and part of the 5th metatarsal.	R.	Good		
93	Bruns	Kappeler's Table.	..	....	1849	Caries	1st and 2d cuneiforms; 1st and 2d metatarsals.	R.	Uncertain	.....	Healed within three months.
94	Massarcani	Kappeler's Table.	..	....	1852	Caries	1st and 2d cuneiforms; 1st metatarsal.	R.	Good	.....	Healed by first intention, and 1 month later patient walked without crutch.
95	Smith	Heyfelder's Table.	..	....	1856	Caries	2d and 3d cuneiforms; 4th and 5th metatarsals.	R.	Good		
96	Küchler	Deutsche Klinik, 1859, No. 41, p. 413.	M.	26	1857	Caries and necrosis	1st and 2d cuneiforms; 1st and 2d metatarsals.	D.	....	Dropsy (Amyloid disease?)	
97	Wright	Hancock, Anat. & Surg. Human Foot, p. 434.	..	....	....	.....	Scaphoid, 3 cuneiforme, 2 metatarsals.	R.	Uncertain		
98	Billroth	Kappeler's Table.	M.	26	1860	Caries	Part of cuboid, 3d cuneiform, 5th metatarsal, part of 4th metatarsal.	R.	Very good	.....	Partial regeneration of bone believed to have occurred.
99	Michel	Mousau, Thèse de Strasbourg, 1863, 2d ser., No. 718.	M.	32	1862	Caries	Anterior half of cuboid, 2d and 3d cuneiforms, bases of 2d, 3d, 4th, and 5th metatarsals.	R.	Very good	.....	After nine months able to do farm work. Could walk from 12 to 15 miles without fatigue.
100	Sanger, E. F.	Med. and Surg. Hist. War Reb. Surg. Vol. Part 3, p. 623.	M.	Adult	1863	Gunshot wound	2d cuneiform, parts of 1st and 3d cuneiforms, base of 2d metatarsal.	R.	Good		
101	Kade	St. Petersb. Med. Zeit., 1864, 7, 183.	M.	Adult	1864	Gunshot injury	Cuboid, 2d and 3d cuneiforms, great part of 4th and 5th metatarsals.	R.	Good	.....	Walked after three months.
102	Kade	St. Petersb. Med. Zeit., 1864, 7, 183.	M.	Adult	1864	Necrosis	Scaphoid, 1st and 2d cuneiforms, greater part of 1st metatarsal.	D.	....	Pyæmia	Lived six weeks.
103	Forster, C.	Guy's Hosp. Rep., ser. 3, vol. xvii. p. 387.	M.	4	1871	Caries	Scaphoid, internal cuneiform, part of 1st metatarsal.	R.	Good	.....	Left hospital after four months. "Gets about very well."
104	Kappeler	Op. cit.	F.	27	1871	Caries	Scaphoid, 3 cuneiforms, part of cuboid, and posterior third of 2d and 3d metatarsals.	R.	Very good		
105	Holmes, T.	Trans. Clin. Soc. 5, 297.	M.	Middle age	1872	Caries	Entire tarso-metatarsal articulation and 2d metatarsal.	R.	Good	.....	Two operations.
106	Nesbitt	Brit. Med. Journ., Dec. 14, 1878.	F.	5	1878	Caries	Cuboid, 2d and 3d cuneiforms, 2d and 4th metatarsals, and later 3d metatarsal.	R.	Very good	.....	Healed in 4½ months.

Excision of part of Anterior Tarsus with part of Metatarsus.—Concluded.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Result as to Usefulness of foot.	Cause of death.	Remarks.
107	Socin	Op. cit.	F.	14	1879	Caries	Scaphoid, 2d and 3d cuneiforms, base of 2d metatarsal.	R.	Very good	.....	After two years "perfect healing."
108	Schüssler	Kappeler's Table.	M.	10	1880	Caries	Cuboid, 2d and 3d cuneiforms, 5th metatarsal, and large pieces of 2d, 3d, and 4th metatarsals.	R.	Very good	.....	Final cicatrization six months after the operation. Reformation of bone. "Function of foot normal."

Total number of cases, 17. Recoveries: very good, 6; good, 7; uncertain, 2 = 15. Deaths, 2.

Recapitulation.

Total number of cases		108	
Recoveries: very good	45		
good	23		
fair	6	96 (88.89 per ct.)	
failures	10		
uncertain	12		
Result unknown		1 (0.93 per ct.)	
Deaths		11 (10.18 per ct.)	
		108	108

Total number of operations performed prior to 1860	31
" " " " subsequent to 1860	64
" " " " date uncertain	13
	108

The three questions to be considered are:—

1. Is excision a safe operation, or at least attended with no greater mortality than the alternative—amputation?

2. Is it likely to put an end to the disease, or is recurrence of the morbid process in the unremoved bones of the foot to be expected?

3. Will the patient, after recovery from the operation, be left with a serviceable limb?

Of the 108 cases collected, 11 died (10.18 pr. ct.), but 1 of them died of amyloid disease in ten days, and 1 of phthisis in a month, and, if we deduct these cases, in neither of which was the fatal result due to the operation, the mortality is reduced to 8.33 pr. ct.; and if Tiling's case is thrown out, in which, after gunshot injury, intermediary excision was made, followed by amputation five days later, and by death from gangrene in another five days, the percentage is reduced to 7.4.

Of the 9 fatal cases (including Tiling's) in 4, at the lowest, a Syme amputation and in 5 a Chopart would have had to be performed; or, to put it in other words, out of 63 cases, in which the alternative was an ankle-joint amputation, 4 died (6.35 pr. ct.); and out of 45, in which a middle tarsal removal might have been made (though without doubt in some of them a Syme or Pirogoff amputation would have been performed), 5 died (11.11 pr. ct.).

The Syme operation mortality for caries is about 6 to 8 pr. ct. (at least 10 pr. ct. according to Delorme), the Pirogoff probably about the same, and the Chopart perhaps 4 pr. ct., though Schede has placed it as high as 10 pr. ct.

Examination of the table further shows, that while it is true that excision is attended with very much less mortality in young subjects, the opinion expressed by certain writers that it should be confined to them, is not warranted by the facts.

Of 87 cases, the ages of which are given, 28 were not over 15 years of age, of whom but 1 died (3.57 pr. ct.), 18 were between 15 and 25 years old, of whom 2 died (11.11 pr. ct.), and 41 were older, of whom 8 died (19.51 pr. ct.).

Of those in whom either the entire tarsus or at least the whole of one of its great divisions was taken away, the death-rate was, under 15 years of age, 6.67 pr. ct., over 15 and under 25, 10 pr. ct., and over 25, 27.27 pr. ct.

Of the 6 operations for gunshot injury the subjects of which were all adults, 1 (Tiling's) resulted in death (16.67 pr. ct.). In 4 of these 6 cases (in which is included the fatal one), an ankle-joint amputation would otherwise, without doubt, have been performed; an operation that for gunshot wound in our late war had a mortality rate of 25.1 pr. ct.

As respects the preservation of life then, excision of the whole tarsus, or of one of its great divisions, is not much, if any, more dangerous than

an ankle-joint amputation, and not very much more so than a middle tarsal operation.

It has, moreover, the advantage of permitting, if necessary, of the subsequent removal of the foot, which, in the cases tabulated, was performed seven times with but a single resulting death. That the disease is very unlikely to reappear is shown by the fact, that in only 3 cases (Champion's, Robert's, and Moreau's) did such recurrence take place. This fact, however, is not so strange as it may at first seem, as it is in direct accordance with the recognized law that the more thorough the removal of diseased bone the less will be the likelihood of a relighting up of the bone inflammation.

By far the most important question of the three proposed is that which has reference to the functional value of the saved foot. Is its usefulness likely to be sufficiently great to warrant the taking of a somewhat increased risk of life, and in subjecting the patient to the necessarily much greater duration of the period of healing—a period that, though it may be as short as four weeks (Wakley's), may occupy more than twice as many months (Socin's), or even half as many years?

In 13 of the 97 cases that did not die, the reports, either because imperfect or made soon after the performance of the operation, do not clearly indicate the end-result. In 10 the operations were failures, subsequent amputation being required in 7 of them; in 1 of these 7, however (Homan's), the healing is stated to have been progressing favourably, the foot having been removed at the patient's request; and in another (Watson's), made out of regard to "the patient's sensitiveness and weakness," the operator was "chagrined to find that there was no condition which should not have admitted of sound cicatrization."

In 6 cases I have considered the result as *fair*, five of the individuals being able to walk about, but requiring the aid of a cane, and in the sixth there was considerable motion at the ankle-joint, and the toes were freely movable, though the woman, two years and a half after the operation, continued to use a crutch in walking.

Forty-five times the ultimate functional value of the foot was *very good*, and twenty-three times more, *good;* and no small part of the twenty-three *good* results might very properly, I think, have been included with the *very good*.

Put in figures, we may say that, of the 108 operations, 10.18 pr. ct. resulted fatally (more justly, as has already been stated, 8.33 pr. ct.). Of the 95 cases, the end-results of which are known, 10.53 pr. ct. were failures; 6.32 pr. ct. left the subjects of them able to walk with a cane or crutch; in 24.21 pr. ct. there was, after complete consolidation had taken place, no pain nor tenderness, little or no limp, and the individuals were not prevented by the condition of the foot from earning a livelihood; and in 47.37 pr. ct. the result was so good that the gait was not a bad one,

the support of the body was firm, and locomotion was so easy and perfect that the individuals could, without special fatigue, walk long distances; even six leagues a day, if we may believe the report of de Housse's case, certainly, twelve to fifteen miles a day, as Michel's patient ultimately did.

As respects shape, though it must be changed, ordinarily materially so, the foot being shortened, broadened, and flattened, still no form of talipes need be developed if due care be taken to maintain a proper position during the period of healing, especially the later part of it.

Surely there was not in any of these sixty-eight cases that "weak, flabby, and deformed condition" of the foot that Roser would have us believe is to be expected, even when rapid healing occurs; and there was not one of the individuals that did not have "a firm weight-supporting foot, the serviceableness of which would compare with that of an artificial foot after a leg amputation." One of Humphry's cases ran about as though nothing had happened. One of Kappeler's patients, from whom he had three years previously removed the entire tarsus with the exception of the posterior part of the os calcis, was able to do full work in a stocking factory, walk over four miles, in a common shoe, without being tired, and as rapidly as others, and even dance, though not waltz.

Durand's patient later served thirteen years as a soldier. Beck's was able to do mountain climbing, and Langenbeck's walked for hours without limping. Each of my own patients whose cases I have reported in this paper earns his daily bread by his daily work, the one as a wagon driver, the other as a baker.

In the case which I reported eight years ago in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, the man walked about the city without any difficulty; and if he did not perform regular work, it was because of his natural disinclination to do any more than he could help, and not because of the condition of his foot.

The ankle motions, even in certain of the complete or almost complete excisions, were to some extent preserved. In Walter's case there was said to be "perfect usefulness of the joint;" and one of my own patients declares that he does not perceive any difference in the movements of the two ankles. Kappeler reports that in two of his cases the arch of the foot was preserved, though in a modified form.

In none of the cases was the shortening of the limb so great that it could not be corrected by a thickened sole; being in two of the eight cases in which the amount has been noted one-half inch, in one three-quarters of an inch, in one one inch, in three one-and-a-half inch, and in one two-and-a-half inches.

Osseous regeneration to greater or less extent was believed to have taken place in eight cases (3, 26, 43, 60, 64, 91, 98, 108).

Examination of the appended table confirms me in the opinion I had already formed from the cases that had fallen under my own observation, that the more extensive the removal of bone, the better the ultimate re-

sult. Münch has expressed himself to the same effect; and Kappeler has very properly declared that the larger the excision the more it resembles amputation, as respects the healing.

The very favourable result following many of the most extensive operations, makes me ready to believe the correctness of the report of Bilguer's case (which I have not included in the table) of removal, after gunshot injury, of "nearly all the bones of the foot," in which ultimately the "officer was enabled to walk and to resume his duties by means of a heel of double the usual thickness;" the truth of which Velpeau was evidently somewhat inclined to doubt.

As respects the method of operating in these tarsal excisions, no definite rules can be laid down. Ordinarily, a lateral incision or one on each side, while rendering the removal of the bones more difficult, will give ultimately the best result, a dorsal cut necessarily dividing the extensor tendons.

It is, however, very probable, that if the ends of such tendons be at once united by sutures, most, if not all, of the disadvantages of such section will be prevented; and even if left to make their attachments as best they may to the soft parts, a very excellent end-result may follow, as in my own case of removal of the tarsus and metatarsus.

Theoretically, the excision when for caries or necrosis should be made sub-periosteally, but, practically, it is very doubtful if the preservation of the periosteum will, in the majority of cases, be of any advantage to the patient; as much, if not all, of such retained membrane will usually be destroyed in the after long-continued suppuration of the wound. Very great advantage attends the use of the Esmarch bandage; and quite firm fixation of the foot and leg must be made.

Immobilization by the application of a plaster-of-Paris dressing, in the single case in which I made it, did not seem to answer as good a purpose as the use of the fracture box, or the tin or wire splint.

In determining in any given case whether or not excision should be performed, the chief, if not the only thing to be taken into consideration, is the probable ability of the patient to endure the protracted period of healing.

Very early or quite advanced age is not a positive contra-indication; Cooper Forster's patient was but four years old; Gant's was sixty; both recovered with useful feet.

In very unhealthy and much debilitated subjects, amputation will generally be preferable to excision; as also in cases of extensive crushing of the foot.

Under other circumstances, as respects the cause of the existing disability and the general condition of the patient, I cannot but feel that enough has already been done by English, Continental, and American surgeons to show that the generally received opinion that extensive tarsal disease necessitates amputation is an incorrect one, or at least one that requires and should have reconsideration.

ARTICLE IV.

ON THE RENAL CIRCULATION DURING FEVER. An Experimental Research made at the Pathological Institute of the University of Leipzig. To which was awarded the Cartwright Prize Essay for 1883.[1] By WALTER MENDELSON, M.D., of New York.

THE object of this research was to determine by experimental methods the actual condition of the circulation in the kidney during fever.

Heretofore no such experiments have, to our knowledge, been made. Renal pathology has had to content itself with hypotheses founded on the general condition of the circulation as it could be observed in more accessible parts of the body, and on the changes occurring in the urine.

It is perhaps natural that from these insufficient methods wrong conclusions have been drawn. Our work, founded on direct experimentation, has shown the opinion, heretofore prevalent, that the kidney during fever is in a state of congestion, to be wrong. Instead of being swollen, from its vessels being distended with blood, it is, on the contrary, small and shrunken, and in a state of extreme anæmia.

We present in this paper the details of the experiments by which we arrived at the above results, as well as further conclusions derived therefrom.

The work was done during the months of May, June, and July, 1882, in the Physiological Institute of the University of Leipzig, where we have acted under the advice and kind auspices of Professor Cohnheim, who suggested to us the subject and gave us his counsel as to its details. We take the opportunity presented to us here, to express to him our thanks and appreciation for all the facilities so freely offered in carrying on this research.

We employed for our investigations the instrument invented by Roy and used by him in studying the functions of the spleen,[2] and by him and Cohnheim together in studying the kidney.[3] This instrument, called the Oncometer or "bulk-measurer" (for description see pages 386, 387, and 388, Figs. 1 and 2), can be applied to the kidney without, as has been shown by its inventor, interfering with the functions of the organ, and it affords at all times an exact index to the condition of its circulation.

Having had thus placed at our disposal a means by which the *circulation*

[1] The Cartwright Prize of $500, open to universal competition, is given every other year for the best original research presented to a committee appointed by the Alumni Association of the College of Physicians and Surgeons of New York.

[2] C. S. Roy, The Physiology and Pathology of the Spleen. Journ. of Physiol., vol. iii.

[3] Same. On the Mechanism of the Renal Secretion. Proc. of the Cambridge Philos. Soc., May 23, 1881. Cohnheim and Roy, Untersuchungen über die Circulation in den Nieren. Virchow's Archiv, Bd. lxci. p. 424 (1883).

could be satisfactorily studied, it next remained to hit upon a method of producing the *fever* in the dogs to be used, while they were in that state of complete immobility during the time the oncometer was in use, which is absolu'ely necessary for success.

As a full comprehension of all the methods used is desirable, in order to fairly judge the results obtained, they will be detailed at length.

Methods of producing Fever.—The ordinary means of artificially producing fever in animals has been to inject into a vein or under the skin, pus, or infusions of various organic matters, as hay,[1] for instance. Lately, von Bergmann and Angerer[2] have found that the injection of solutions of pepsin, and of fresh gastric juice into the blood causes a marked rise of temperature, and although we cannot, from want of sufficient proof being adduced, agree with the explanation given by the authors, still the fact we have a number of times confirmed.

The fever produced by these various means has always been in animals not under the influence of drugs which paralyze the motor or sensory functions. We found that when these functions were profoundly affected the expected febrile rise of temperature did not ensue, as was illustrated by the fo lowing experiments:—[3]

[1] Billroth, Langenbeck's Archiv, vol. ii. vi. xiii. C. J. Weber, Berlin. klin. Wochens. 1864.

[2] E. v. Bergmann and J. Angerer. Das Verhältniss der Fermentintoxicationen zur Septicæmie. Festschrift zur Feier des 300-jährigen Bestehens der Universität zu Wurzburg, 1882. These authors hold that the injected pepsin, gastric juice, etc., have the power of dissolving the white blood globules, which leads to a coagulation of the blood, and that all the symptoms, as vomiting, diarrhœa, dyspnœa, etc., are due to capillary thrombosis of the organs in which these symptoms originate. It is not quite clear to us whether they regard the fever as due to a prevention of radiation from the skin on account of the cutaneous capillaries being occluded, but it would almost seem to follow from their statements. Of the actual occurrence of this general capillary thrombosis there are no conclusive proofs, and to our mind it seems much more likely that the symptoms are of nervous origin; the digestive ferments injected into the blood producing a disturbance of the central nervous system.

[3] Since writing the above, N. Zuntz has published a short article entitled "Zur Theorie des Fiebers" in the *Centralblatt f. d. med. Wissenschaften*, No. 32, August 12, 1882, in which he describes obtaining results in curarized dogs, identical to ours. Zuntz concludes, rather hastily it seems to us, that the febrile process in general is due to increased oxidation caused by the irritation of the nerves by pyrogenous agents, and as the muscles are the chief seat of tissue metamorphosis, consequently—he argues—when the terminal nerve-plates are paralyzed by curara, the oxidizing powers of the muscular tissue become paralyzed also, and no fever ensues.

This assumption, however, does not tally with our cases where there was absence of fever in animals under the influence of *morphine*, where the nervous supply of the muscles was in nowise affected. Much more investigation, and especially calorimetrical determinations like those of Senator, Wood, etc., are necessary before such a complex question, involving so many different factors, can be definitely decided.

Our own opinion is that the absence of fever is due to some central nervous cause, but whether inhibitory or irritative in nature we would not venture to say.

Experiment No. 2.—Injection of pus after morphine. May 12th, 1882. Dog. Weight 6500 grams. 10.40 A. M. Temp. 39.3° C. in rectum.

Time.	Temp.	Remarks.
10.40 A. M.	39.3° C.	Injected 0.06 morphine hypod.
10.45	.....	Vomited and defecated. Beginning to grow quiet.
10.50	.....	Losing power in legs; sinks to floor.
11	38.4	Injected beneath skin of left thigh 25 c.c. fresh pus, free of all odour, and containing very few bacteria.
11.15	37.5	Asleep, but easily awakened by any sudden noise. Covered up.
11.55	36.4	Lying on side; quiet, but not asleep.
12.30 P. M.	36.3	
2	36.4	
2.45	36.8	Running about in an uneasy, aimless sort of way.
3.45	37.2	
7.45	39.4	
May 13th.		
9.30 A. M.	40.8	Listless and dejected. No appetite.
11.15	40.6	

In this experiment but 0.06 of morphine were injected; an amount barely sufficient to put the dog asleep for any length of time, let alone to produce a deep narcosis, yet the temperature sank from 39.3° to 36.3° in a little less than two hours, in spite of the fact that a quantity of pus had in the mean time been injected,—pus which in another dog, not morphinized, caused a rise of temperature from 36.3° to 39.9° in forty-five minutes. Nor till nearly nine hours after the purulent injection, and when the effects of the morphine may be fairly assumed to have passed away, had the temperature risen to its original value. The next morning the dog was dejected, ate nothing, and in fact presented all the outward symptoms of having fever. The temperature was 40.5°, and remained at about that height during the day, showing that the lack of fever in the beginning was not due to the pus having lost its fever-producing properties, but to the action of the morphine upon the system.

Experiment No. 12.—In a healthy dog weighing 5420 grams, and having a temperature of 39.2° C. at 10.30 A.M., 20 c.c. of hay infusion were injected into a vein. The infusion was two days old, had no putrid odour, but contained a large number of bacilli. At 1 P.M. the temperature had risen to 40.6° C. when 14 c.c. of the same infusion were injected hypodermatically, and the animal placed in a warm-air chamber, having a temperature of about 20° C. This last precaution was taken to prevent excessive radiation, the day being somewhat cool. In the meanwhile the dog had become much dejected, vomited frequently, or made attempts to do so, and had had several movements from the bowels. At 2.5 P. M., three hours and thirty-five minutes after the first injection, the temperature was 41.5° C., a rise of 2.3° C., proving conclusively the power of this infusion to cause fever. The dog afterward recovered fully.

Experiment No. 13.—Injection of hay-infusion after (morphine and) curara. June 15th, 1882. Bitch. Weight 4970 grams.

Time.	Temp.	Remarks.
9.50 A. M.	39.4° C.	Before any operative interference.
10	.....	Injected hypod. 0.02 morph., and after exposing left kidney for the oncometer, and performing other necessary operations, injected into vein 3 c.c. of a ½ per cent. sol. of curara (which had to be followed at intervals by more).

Time.	Temp.	Remarks.
11.30 A. M.	.....	Put in warm box (temp. about 30° C.), and injected into vein 25 c. c of same hay-infusion that was used in the experiment just detailed.
11.40	34.4° C.	
12.10 P. M.	34.2	
12.30	34.2	
12.55	34.4	
1.25	34.6	
1.45	34.7	

A small quantity of morphine was given in the beginning to sufficiently dull the pain of the operation, and the curara administered immediately before the oncometer was applied to the kidney. During the hour and a half used in performing the necessary operations (which aside from the larger one of exposing the kidney, included the minor ones of laying bare the carotid and inserting a canula for connection with the manometer, besides preparing a vein for the injection of curara and hay-infusion), the temperature fell five degrees, part of which was due to the depressing effects of the morphine and curara, and part to the operation itself. However, in spite of putting the animal in the most favourable condition to prevent loss of heat by radiation, the temperature, after injecting the hay infusion, rose but three-tenths of a degree in two hours.

Experiment No. 19.—Injection of pepsin. June 24th, 1882. Dog. Weight 6000 grams (same dog that was used in Exp. 12, now perfectly recovered).

Time.	Temp.	Remarks.
10.55 A. M.	39.7° C.	
11	.....	Injected into vein 5 grms. pepsin in 50 c. c. water. (Pepsin did not dissolve completely.)
11.45	40.9	Trembling violently (chill); much dejected.
12.20 P. M.	40.8	
1	41.4	
1 30	42.2	Condition unchanged, but trembling ceased.
6	39	Evidently feels better. Vomited a good deal during afternoon.

This rapid rise of temperature coincides with the results obtained by von Bergmann and Angerer.

Experiment No. 22.—Injection of pepsin after chloral. June 28th, 1882. Dog. Weight 4000 grams.

Time.	Temp.	Remarks.
10.45 A. M.	.....[1]	Injected about 5 grams of chloral in solution into stomach.
11.15	36.6° C.	Dog very drowsy, but not completely narcotized. Injected about 3 grms. pepsin in 50 c. c. water (filtered solution) into vein, and put dog in a warm box at a temperature of 25°.
11.30	35 5	
12	35.2	
2 P. M.	.....	Dog so far recovered as to be able to walk about.
4.30	40.2	Tremors; much dejection.
6.15	39.9	
June 29th.		
10 A. M.	39.9	Dog eats little, and is dejected. (Subsequently recovered entirely, and was used for another experiment.)

[1] By an oversight the temperature of the dog before giving the chloral was not taken.

This experiment, like those performed with morphine and curara, shows that after giving the chloral, a primary fall of temperature took place, which lasted as long as the effects of the drug were present. Not till the power of the chloral had sensibly diminished did the pyrogenous agent begin to assert its presence in the organism, by causing a rise of temperature.

The results of the experiments made to produce fever in narcotized animals (and more than are here enumerated were performed, and all with a like result) may therefore be summed up as follows :—

In dogs in which complete motor or sensory paralysis (or both) have been produced by morphine, chloral, or curara, there is a rapid and considerable fall of the bodily temperature, even when radiation is to a great degree prevented by inclosing the animals in a warm-air box. Injections into the blood of pyrogenous agents, such as pus, hay-infusion, and pepsin, fail to cause a rise of temperature as long as the system is under the effects of the drugs used.

Morphine, chloral, and curara were the only agents employed, but it is likely that other similar drugs would act in the same way.

Having thus been defeated in our attempts to cause fever in dogs by all the ordinary means, under the conditions necessary for the experiment, a number of trials were made with the oncometer in curarized dogs in which an artificial rise of temperature was produced by keeping them inclosed in a warm-air chamber. In this way, it is almost needless to say, very high temperatures (up to 45.5° C.), could without difficulty be maintained. The results of these experiments will be given further on.

The warm-air chamber consisted simply of a galvanized sheet-iron box with double sides and bottom, the space between being filled with water kept hot by Bunsen burners placed beneath. In the walls of the box were suitable openings for the insertion of thermometers. For a cover, a double layer of thick felting was found to be the most convenient.

However interesting and instructive the results were obtained with the artificial *thermic* fever (if we adopt the nomenclature of H. C. Wood[1]), still it might well be objected that as thermic fever is not yet universally acknowledged to be identical in its nature with infectious and other fevers, so the deductions drawn from experiments on the former would not hold good when applied to the latter. Some other method, therefore, had to be contrived in which the source of the fever should be internal and not external, and in which the dog should still be insensitive enough to allow of a successful application of the oncometer.

Wood,[2] in his experiments on fever, found that lesions of the brain above the vaso-motor centre in the medulla, produced no change in the arterial blood pressure. The thalami optici are supposed to contain the sensory

[1] H. C. Wood: Thermic Fever or Sunstroke, Philada. 1872.

[2] Same. Fever, a Study in Morbid and Normal Physiology. Smithsonian Contributions to Knowledge, No. 357, Washington, 1880.

tracts; consequently, we thought, destruction of these centres might render the animal operated on insensible to pain, while its power of reacting to pyrogenous agents would remain unimpaired.

On consulting Professor C. Ludwig on the feasibility of this plan, he informed us that he had for some time used this method himself for producing immobility in animals in which he was studying the functions of the various cardiac nerves, and had found that no change, either in the blood-pressure or the heart's action, occurred after this lesion of the brain. His mode of operating consists in trephining the skull about five mm. on either side of the median line, so as to avoid the longitudinal sinus, and at the point of the greatest cranial convexity, which lies four to five centimeters in front of the prominent occipital tubercle. After making a small slit in the dura mater a blunt glass rod of about two mm. in diameter is gently pushed down, directly vertically, toward the base of the skull, till it strikes the bone. The operation, as far as the brain is concerned, is almost bloodless, and it will be found that in nearly every case the thalamus has been punctured.

Dogs so operated on are, for all the purposes of the experiment, immobile and insensitive enough to allow of the perfect application of the oncometer, and furthermore, it was found that injections of pyrogenous agents caused the desired rise of temperature. As hitherto our promptest results had been obtained from injections of pepsin; this agent was used in these experiments.

The following experiment is detailed here; for others, see Experiments Nos. 24 (p. 403) and 25 (p. 393).

Experiment No. 23.—Injection of pepsin after puncture of right thalamus. June 28th, 1882. Bitch. Weight 3300 grams.

Time.	Temp.	Remarks.
12.30 P. M.	39.8° C.	Before any operation.
1.10	.....	Punctured right thalamus.[1] Dog's body turned to left, and has "circus movements" in same direction. Anæsthesia apparently on both sides, and blindness. Sensorium much affected.
1.45	39	Injected a filtered solution of 2 grms. pepsin in 40 c. c. of a 0.6 per cent. solution of NaCl.
2	38.8	Put in warm-air box, temperature about 25°.
3.15	39.7	Lying quietly.
4.30	40.4	
5.45	40.3	
6.10	40.3	Removed from box. Condition much the same as in the beginning. Drinks water when offered it, and notices when called. Head wound dressed with iodoform.

June 29th. 10.30 A. M. T. 39.8° C. Circus movements not so marked, though body, when dog stands quietly, is turned to left. Soon sinks on right side

[1] It was found that the puncture of one thalamus was sufficient for practical purposes, and that the temperature rose more rapidly and higher than when both thalami were destroyed.

when left alone. Licks itself, and notices when called. Growls and tries to bite when handled. No appetite.

July 3d. Dog eats well. Circus movements gone. Some anæsthesia on both sides, more on right. Wound in scalp healing well.

Unfortunately, no *post-mortem* examination of the brain was subsequently possible, as the dog escaped from the yard in which it was confined, and was seen no more. It may, however, be safely assumed that the thalamus was punctured in this instance, for in the eight other times, in which this operation was performed, *post-mortem* examination showed that the thalamus had always been reached.

Having thus determined upon a method of producing fever in dogs which would satisfy the conditions of the research, it next remained to investigate, by means of the oncometer, the effects of this fever on the circulation of the kidneys.

Description of Apparatus.[1]—The oncometer of Roy[2] is an ingenious application to organs *in situ* of the plethysmograph of Mosso.[3] The principle of its action, like that of the latter instrument, depends on the expansion of the organ under investigation (due to an increased amount of blood entering it), displacing a quantity of some surrounding liquid, as oil, equal in amount to the increase in volume the organ has undergone. By means of suitable mechanical appliances these variations in bulk, transmitted to the surrounding liquid, are registered graphically upon the revolving drum of Ludwig's kymograph.

The Oncometer.—The oncometer, as constructed for the kidney, consists of an ovoid box of sheet-copper, and is composed of two symmetrical halves joined by a hinge, A (Fig. 2). Each half is made up of two shells, B B′, the inner fitting accurately into the outer. By means of the nut, C, which plays upon the tubular screw, D, soldered into an opening at the point of greatest convexity of the inner shell, and projecting through a corresponding opening in the outer shell, the two may be drawn closely into apposition with each other. Into the tubular screw, D, fits the double canula, E, composed of a larger and a smaller tube, as shown in the figure.

At the large canula, F, connection is made with the writing-apparatus, to be described later, whilst the smaller, G, serves to allow any air-bubbles to escape that may have remained after the instrument has been filled with oil. At a point on each half of the box opposite to the hinge there is a semicircular piece cut out of each edge, which makes a round opening, H, when the box is closed. This opening is provided with a brass collar, K, holding the eccentric catch, L, which keeps the instrument shut when in use. Through this opening the vessels, nerves, and ureter of the kidney pass, as is shown diagrammatically in Fig. 2 (where M represents the kidney, and N

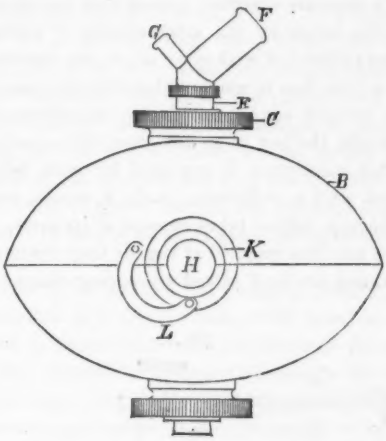
[1] This apparatus may be procured of Mr. Max Schanze, Machinist to the Pathological Institute of Leipzig.

[2] C. S. Roy, The Physiology and Pathology of the Spleen, Jour. of Physiology, vol. iii. No. 3.

[3] A. Mosso, Von einigen neuen Eigenschaften der Gefässwand, Ludwig's Arbeiten, 1874.

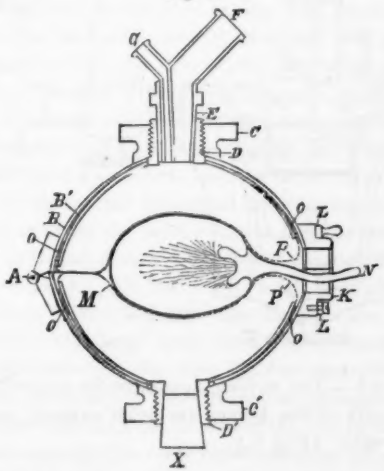
the vessels, nerves, and ureter), the thick, rounded edge of the brass collar, K, preventing their being sharply bent or injured in any way.

Fig. 1.



When the oncometer is to be used, both the inner shells are removed by unscrewing the nuts, c c′. Around the rim of each, half a centimeter

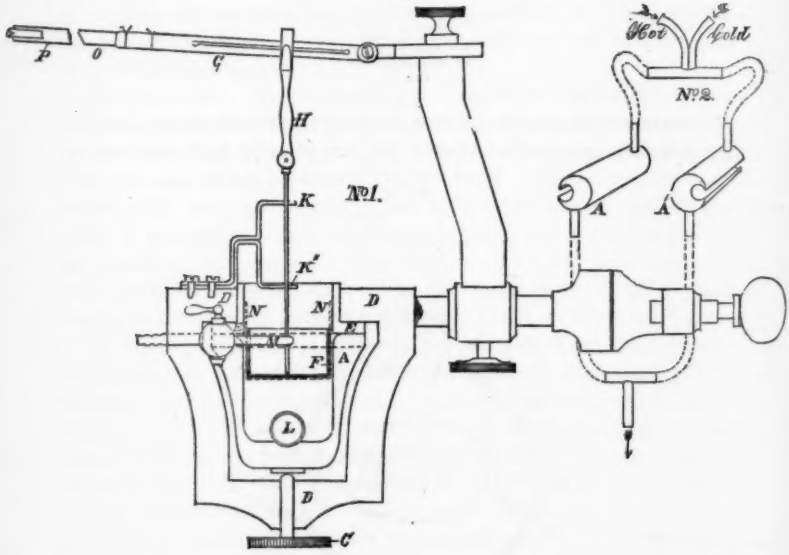
Fig. 2.



from the edge, a flat rubber band (shown in section at o o, Fig. 2), upon which caoutchouc varnish is smeared, is stretched to serve as a washer.

Over the concavity of each of the inner shells a piece of moistened calf's peritoneum[1] is loosely laid, the edges turned over, and pressed against the varnish on the washers, and the inner shells are then replaced and brought firmly against the outer ones by the nuts C C′. Each half of the oncometer consists now of a separate chamber, bounded on the outside by the copper shells, and on the inside by the membrane, P P′ (dotted line). These chambers are next filled full with olive oil, to the exclusion of all air. A quantity of oil, a little less in amount than it is calculated the kidney will occupy, is then pressed out by raising the membranes with the fingers from beneath, whilst the box is so held that the opening for the canulas is highest. This manœuvre is repeated for each half in turn. One opening is closed with a well-fitting cork, X, whilst into the other, the double canula, having rubber tubes on each of its arms, is inserted. The canula and tubes are then emptied of the air they contain by pressing the oil up into them, and are kept closed by spring clamps placed upon the tubes.

Fig. 3.



The Oncograph.—The writing apparatus for recording graphically the changes in the bulk of the kidney (or other organs) has been called by Roy the oncograph. (Fig. 3.)

[1] After numerous experiments with other membranes, Roy found this one to answer all conditions, it being thin, flexible, impervious to, and unaffected by oil. See Journal of Physiology, vol. i. p. 454; vol. ii. p. 325; vol. iii. p. 205, etc.

Briefly, it consists of a cylinder, A, which by means of the screw, C, may be firmly held against the flat, annular flange, E, of the frame, D. Within the cylinder is an exceedingly thin and light piston-head, F, made of hard rubber, which is connected above with the lever, G, by the jointed piston-rod, H, passing through the guides, K K′. The lower joint of the piston-rod consists of a delicate steel wire, whilst the upper and the lever, G, are of aluminium, in order that their weight shall offer the least resistance to slight impulses received by the piston-head. Between the cylinder, A, which receives the oil, and the flange, E, is clamped a piece of the same membrane used before (shown by the dotted line, N), which prevents the escape of the oil from between the cylinder and the piston. Through the brass tube, L, the oil within the cylinder is connected with that in the oncometer by means of short glass tubes, connected by bits of rubber tubing.

When the cylinder is to be filled, the piston is pressed down as far as the membrane will allow it to go, the cock of the tube, M, is opened, and oil is then allowed to enter from a height through the tube L, the air escaping through M. When the cylinder is entirely full, a clamp is put upon the rubber tube connected with L, and the piston pressed downwards until the lever stands at any desired angle, the surplus oil escaping through M, the cock of which is then shut. The lever is lengthened by tying to it a culm of straw pressed flat, and which has a small piece of aluminium, P, bent and pointed to act as a style, attached to its end by sealing-wax.

Preparation of the Animal.—The dog (animals weighing from five to seven kilos were commonly used), after having been rendered insensible or immovable by one of the means already described, was placed upon its right side, and, after shaving the skin of the left flank,[1] an incision extending from the lower border of the last rib nearly to the crest of the ilium was made. The muscles and fasciæ were then cut through, layer by layer—any large vessels that bled being ligated, and the larger nerves being cut—until the line of aponeurotic junction between the sacro-lumbalis and the oblique and transverse abdominal muscles was reached. This was then so incised as to cut the peritoneum as little as possible, and the kidney, enveloped in its fat, drawn carefully out through the wound, and its capsule dissected away. All the small vessels that enter the cortex from the capsule were either tied with fine thread close to the organ, or closed by tortion. The large renal vessels and ureter at the hilus were only so far separated from the loose fat and connective tissue that envelop them as was necessary to allow their free passage into the oncometer. Especial care was taken not to wound the fine plexuses of nerves and lymphatics that surround the renal bloodvessels on all sides.

The kidney having been prepared, the dog was removed to the warm-

[1] As the left kidney lies somewhat lower than the right, it is more accessible.

air box and the oncometer, previously warmed by being placed in hot water, applied. Great care was taken not to allow any air to enter the oil chambers, as the presence of even a small quantity, by its rapid expansion with the rise of temperature in the dog, may cause considerable errors in the interpretation of the traces. To avoid therefore the entrance of air, the following method was, after trial of others, found satisfactory.

The oncometer was filled pretty full of oil in the beginning, as described on page 388, and closed over the kidney. The two halves being then gently pressed together, and the larger tube of the canula being open, the superfluous oil flowed out. As soon as enough had escaped to allow the edges of the two halves to come together, the catch was snapped and a clamp applied to the tube, which was then connected with the writing apparatus, whose tube and the tube of the canula were filled to the top with oil from a pipette before being joined. In this way a continuous connection between the body of oil in the oncometer and that in the oncograph was effected. By raising or lowering the dog the two instruments were next brought on the same level, in order that the column of oil should exert no pressure, either positive or negative, upon the kidney.

As tracings of the general arterial pressure were always taken along with those of the kidney, the left carotid was connected with the registering manometer, the style of the latter being so arranged as to be as nearly perpendicular as possible beneath that of the oncograph.

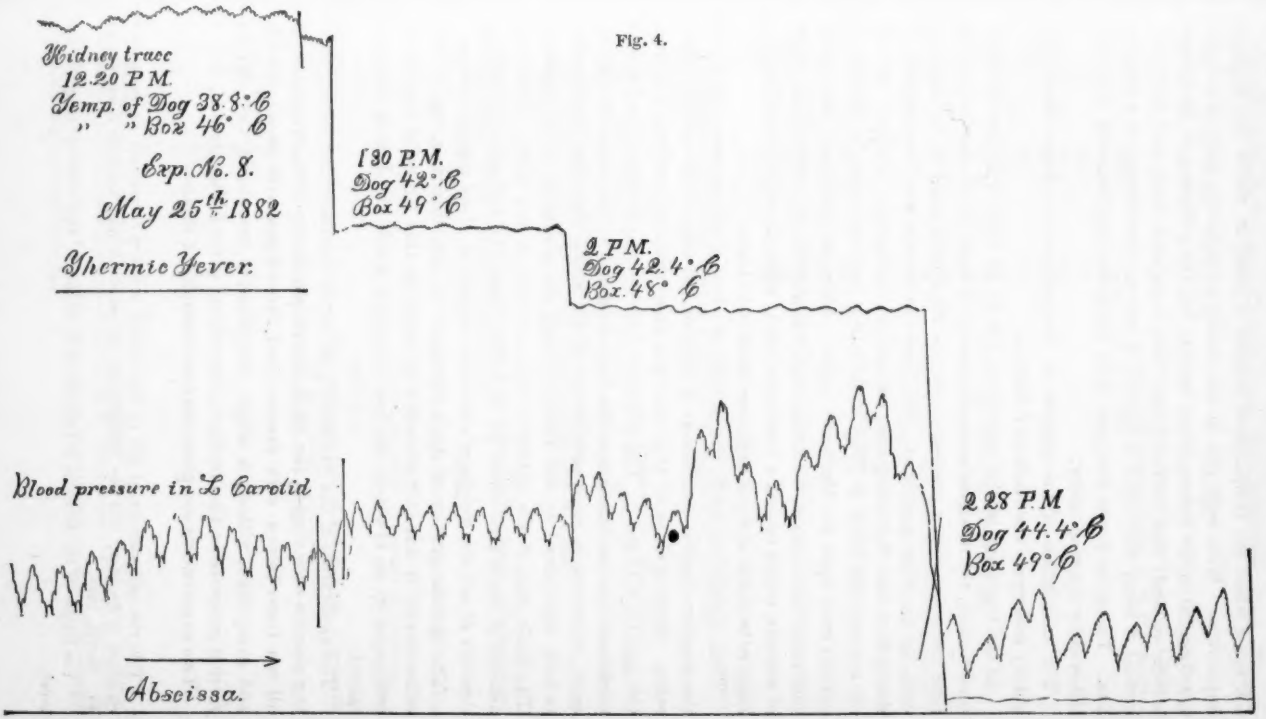
Of the two curves thus traced upon the blackened paper of the kymograph, the upper corresponded to the variations occurring in the bulk of the kidney, and the lower to those in the arterial pressure as measured in the carotid.

On inspecting Fig. 4, it will be seen that the kidney trace consists of a series of waves, each wave being made up of a number of wavelets. The former correspond to the respiratory waves of the pulse, while the latter are the pulse-waves themselves. The accuracy with which these are traced forms a good index to the sensitiveness of the apparatus.

As each experiment always extended over a number of hours, it was, of course, out of the question, and, indeed, unnecessary to take a continuous tracing of the whole duration, but instead, short tracings were made, generally at intervals of from five to fifteen minutes. The temperature of the dog, taken in the rectum or vagina, was noted on the blackened paper at the beginning of each of the sections of which the whole tracing was finally composed. In this way a very graphic impression of the results of the experiment was obtained on a space of paper readily overlooked at once.

It will be observed, on examining Fig. 4, of Experiment No. 8, detailed below, that the kidney tracing constantly approaches nearer and nearer to the abscissa, whilst the mean arterial pressure gradually rises, only to

Fig. 4.


Kidney trace
12.20 P.M.
Temp. of Dog 38.8° C
" " Box 46° C
Exp. No. 8.
May 25th 1882
Thermic Fever.
1.30 P.M.
Dog 42° C
Box 49° C
2 P.M.
Dog 42.4° C
Box 48° C
2.28 P.M.
Dog 44.4° C
Box 49° C
Blood pressure in L. Carotid
Abscissa.

fall again when the temperature reaches a point at which life becomes impossible.[1] With each rise in the bodily temperature, there is a corresponding fall in the kidney trace, until at last the pulsations of the kidney become so small that the oncograph fails to register them, and the trace, instead of being made up of a number of curves, now changes to a straight line. The pulse waves disappear first, being the smallest, and these are followed by the respiratory.

The calculation of the amount of diminution in volume which the kidney undergoes was made as follows:—

At the beginning of the experiment (or at its close, it makes no difference which), the oncograph was disconnected from the oncometer, and its tube connected with a graduated burette filled with some of the same oil used for the other apparatus. Oil from the burette was then allowed to slowly flow into the oncograph, one cubic centimetre at a time. As the oil entered, the lever G (Fig. 3) of course rose, its style, P, making an upright trace upon the blackened paper. After the injection of each cubic centimeter the drum of the kymograph was allowed to revolve for a couple of seconds, which caused a horizontal mark, about a couple of millimeters long, to be made at right angles to the former trace.

Thus, a scale was made, the number of whose divisions corresponded to the number of cubic centimeters of oil that had entered the writing apparatus. Each division of this scale was then measured, and was found in this case to be 13 mm.[2] The difference between the height of the lever, as measured from the abscissa, at the beginning and at the end of the experiment, expressed in cubic centimeters of oil, would therefore give the loss in bulk maintained by the kidney during the course of the experiment. The diminution of the kidney's bulk, however, is due to the diminished amount of blood that enters it; therefore, instead of reckoning cubic centimeters of *oil*, the weight of cubic centimeters of *blood* must be taken.

The specific gravity of dog's blood, as we determined it, was 1.061; consequently, it was only necessary to substitute this figure for each cubic centimeter of oil to obtain the loss in weight which the kidney had sustained.

The application of the oncometer, merely to determine the facts regarding changes occurring in the renal circulation during fever, was made in all ten times (seven with thermic, and three times with pepsin fever), and every time, without a single exception, it was shown that *during fever a progressive diminution in the volume of the kidney occurs.*

Two experiments are given here as examples of this:—

[1] This rise and subsequent fall of the arterial pressure correspond to the results obtained by Senator. See Die Albuminurie im gesunden und kranken Zustande, p. 45. Berlin, 1882.

[2] The length of the divisions of the scale will, of course, vary with the length of the lever.

Experiment No. 8 (Fig. 4).—Thermic fever. May 25th, 1882. Dog. Weight 5 kilos.

Time.	Temp. of dog.	Temp. of box.	Remarks.
10.30 A. M.	39.4° C.	.....	Before any operation. Then exposed left kidney, left carotid, and a vein. Curara, and artificial respiration 26 to the minute.
11.35	38.2	.....	Put in box.
11.55	38.2	45° C.[1]	
12 M.	38.3	46	
12.20 P. M.	38.8	46	
12.30	39.2	46	
12.55	40.2	47	
1.5	40 6	47	
1.20	41 4	49	Restless; received more curara.
1.30	42	49	Still somewhat restless.
1.40	42.2	48	
1.45	42.4	48	After about every 6th respiration there is a temporary increase of the blood pressure, with a corresponding temporary decrease in the volume of the kidney.
2	43	49	
2.20	44.2	48	
2.35	44.6	51	
2.45	45	52	
2.55	45.4	48	
3.10	.....	...	Dog dead. Renal vessels tied, and the organ removed and weighed; weight 24.55 grms.

Calculation.—Height of lever at beginning of experiment, mm. 126
" " " " close " " mm. 2.5

Difference, mm. 123.5

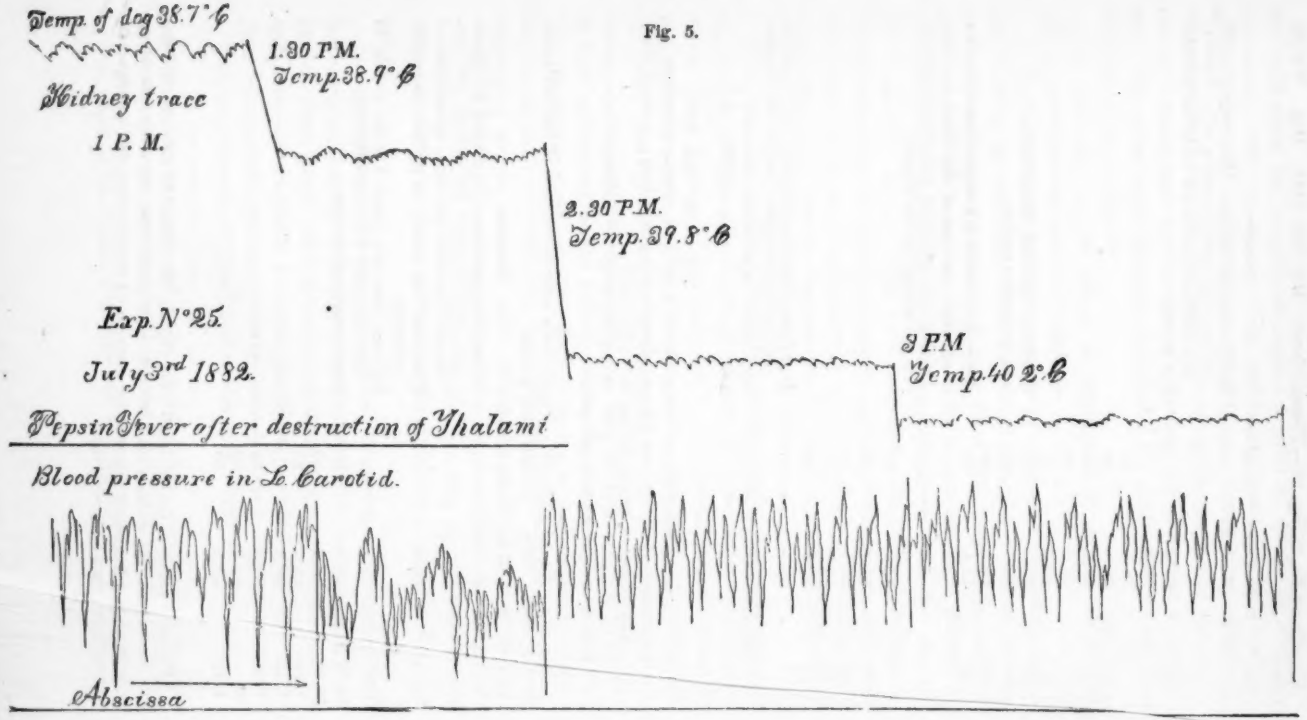
13 mm. on the scale = 1 c.c. oil = 1.061 grm. blood; therefore
123.5 mm. " " " = 9.5 c.c. oil = 10.079 grm. blood; = what the kidney lost in weight during the experiment.
24.55 + 10.079 = 34.629 grm. = original weight of kidney.
Loss of weight = 29.08 per cent.

Experiment No. 25 (Fig. 5).—Pepsin fever after destruction of left thalamus. July 3d, 1882. Dog. Weight 6400 grams.

Time	Temp. of dog.	Temp. of box.	Remarks.
9 A. M.	39.7° C.	.....	Before any operation. Punctured left thalamus, then exposed the kidney, and performed the other necessary operations.
11.45	38.6	.....	Placed in box, merely to prevent excessive radiation.
11.55	.....	.....	Injected into vein about 6 grms. pepsin in 100 c.c. water (filtered solution).
12.10 P. M.	38	35° C.	Considerable salivation.
12.20	38.2	35	
1.30	38.9	35	
1.55	39.3	...	
2.30	39.8	35	
3	40.2	30	
3.40	40.5	30	

[1] The temperature of the box in all these experiments cannot be taken as the absolute one to which the animals were exposed, as in many cases the cover was left off entirely, or very frequently removed for purposes of examination, and consequently free radiation must have occurred.

Fig. 5.


Temp. of dog 38.7° C
1.30 P.M.
Temp. 38.9° C
Kidney trace
1 P. M.
2.30 P.M.
Temp. 39.8° C
Exp. N° 25.
July 3rd 1882.
3 P.M.
Temp. 40.2° C
Pepsin fever after destruction of Thalami
Blood pressure in L. Carotid.
Abscissa

Time.	Temp. of dog.	Temp. of box.	Remarks.
4.50 P. M.	41.2° C.	28° C.	Dog restless; mouth dry; drinks water when given it. Respiration at times very jerky. Has spasms of extensor muscles of limbs and trunk.
5.40	41.9	28	
6.10	41.8	28	
6.15	41.6	...	
6.20	.....	...	Tied renal vessels, and removed kidney. Weight 21.2 grms. Dog killed.

Post-mortem Examination.—Left thalamus extensively destroyed. The lower half of the right thalamus has been punctured in a direction from the median line.

Calculation.—Height of lever at beginning of exp't (temp. 38 6°), mm. 155
" " " " close " " (temp. 41.9), mm. 105

Difference, mm. 50

13 mm. on the scale = 1 c.c. of oil = 1.061 grms. of blood; therefore
50 mm. " " " = 3.85 c.c. of oil = 4.08 grms. of blood = what the kidney lost in weight during the experiment.
4.08 + 21.2 = 25.28 grms. = original weight of kidney.
Loss of weight = 16.14 per cent.

The following are the estimations of the loss of weight the kidney sustained in different experiments.

	No.	Thermic fever.	Pepsin fever.
Experiment No.	7,	31.14 per cent.	.....
" "	9,	20.33 "	.....
" "	10,	32.49 "	.....
" "	11,	23.12 "	.....
" "	24,	.....	7.88 per cent.
" "	25,	.....	16.14 "

As it could be supposed that this contraction of the renal vessels, causing the loss in bulk of the kidney, might take place in non-fevering dogs as well, merely from the irritation due to the presence of the oncometer, several experiments were made to settle this point. The oncometer was applied to the kidney and left on for several hours, the bodily temperature being normal. It was found, however, that the kidney retained its original volume throughout, but began to contract as soon as fever was afterward superinduced.

Determination of Cause.—The fact of the kidney's diminished volume having been thus definitely determined, it now remained to investigate the causes.

That changes in the volume of the kidney must depend on the amount of blood contained in its bloodvessels at any one time, becomes evident when we consider that the kidney is an organ which, outside of these vessels, contains no contractile elements.

Variations in the volume of blood caused by changes in the calibre of the renal capillaries may take place either from a central irritation, a peripheral irritation, or a combination of the two.

Peripheral Irritation.—Roy and Cohnheim have shown that when the nerves of the kidney are intact a contraction of the organ, consentaneous

with the rise of the general arterial pressure, occurs when a peripheral stimulus is applied to any part of the body. This reaction may be used as a test to determine whether the connections between the nervous centres and the kidney have been completely severed or not.

Section of the nerve trunks supplying the kidney is always a tedious operation, and at best an uncertain one, as the origin and course of the nerves are subject to considerable variation.[1] We found it better, instead of severing the main branches, to carefully tear away with a pair of delicate forceps, all the nerves that could be seen entering at the hilus, and as these surround the vessels in a close plexus, considerable care is requisite to clean them away thoroughly. The ureter was divided about an inch from the hilus, in order to cut off all nerves entering on it.

It was found in the majority of cases, that after this operation had been carefully done, the kidney no longer, or but slightly reacted to peripheral stimulation, showing conclusively that all, or by far the greater number of renal nerves must have been divided. As intra-renal ganglia have not to our knowledge been discovered, it was *a priori* to be supposed that after severance of the nervous connections no change would occur in the kidney during a rise of temperature. This supposition proved to be correct.

Experiment No. 33.—Kidney enervated. Thermic fever. July 20th, 1882. Dog. Weight 5400 grams.

Time.	Temp. of dog.	Temp. of box.	Remarks.
10.30 A. M.	39.5° C.	.....	Before operation. Gave morphine 0.04 hypo. and later curara. Artificial respiration. Kidney exposed and enervated of all visible nerves, and ureter cut.
12	36.9	.....	Faradic stimulation of sciatic causes rise in arterial pressure, but kidney remains almost unaffected.
12.45 P. M.	38	45	
1	38.9	52	
1.15	39.7	42	
1.55	40.7	42	
2.5	41.6	...	Dog killed.

On inspecting Fig. 6, corresponding to this experiment, it will be seen that after a faradic stimulation of the sciatic the arterial pressure became increased, while the kidney underwent but a very slight enlargement. At first sight it might be supposed that the kidney trace ought to follow in parallel lines that of the arterial pressure, rising and falling with it, but that it does not do so, but remains, on the whole, nearly parallel to the abscissa, may be explained by the fact that when the renal nerves are severed, the capillaries, owing to lack of tonus, at once dilate nearly to their maximum capacity, and being thenceforth always in a state of engorgement, cannot be filled much fuller, even when a general rise of arte-

[1] Fr. Nöllner, Die Anatomie des Splanchnicus und der Nierennerven beim Hunde. Eckhard's Beiträge zur Anatomie und Physiologie. Giessen, 1869.

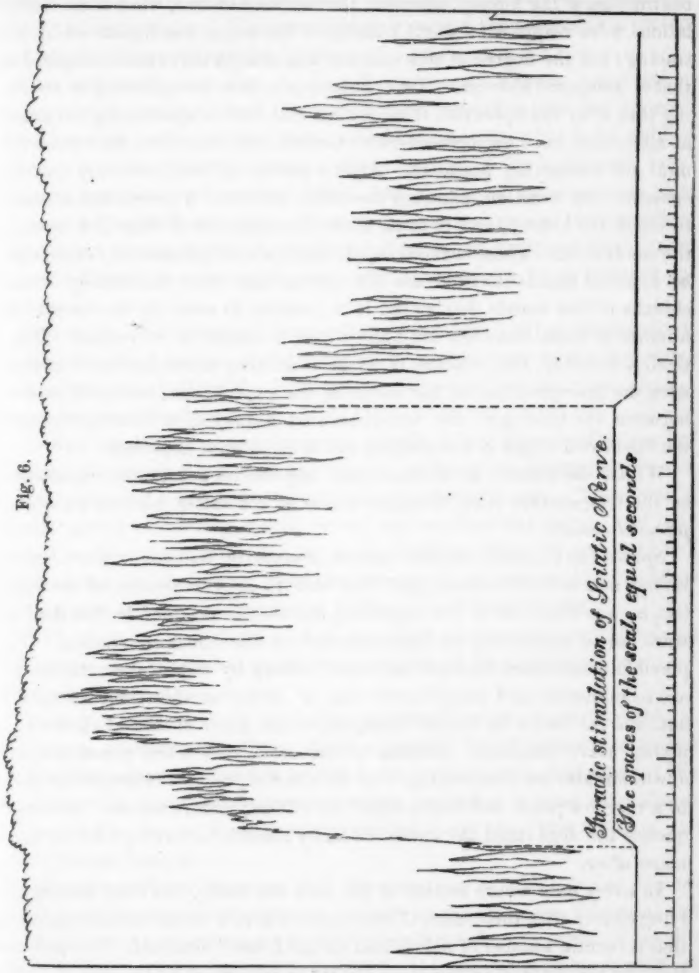


Fig. 6.

rial pressure occurs. That the arterial tonus is much diminished, if not gone entirely, is confirmed by the separate pulse-waves of enervated kidneys being usually larger than of those in which the nerves have been left intact.

It was several times observed that strong faradic stimulations, applied to the sciatic immediately after the enervation, failed to produce any

contraction of the kidney, whereas, after an hour or two, when these stimulations were reapplied, a slight reaction of the organ was registered by the tracing; but the degree of this reaction was always very small compared to that of uninjured kidneys. This phenomenon may be explained by assuming that after the operation those nerves that had escaped being cut must, at all events, have been considerably bruised, and thus for a time rendered unfit for conducting purposes. After a period of rest, however, they recovered their function, allowing the reflex effects of a peripheral stimulus to reach the kidney, and to cause there a contraction of those few vessels, the conduction of whose nervous supply had not been permanently destroyed. So fine and almost invisible are the nerves that enter the kidney on the sheaths of the vessels that whilst it is possible to sever by far the greater number of them, some few are almost sure to escape in every case. Practically, however, the presence of these remaining fibres does not interfere with the interpretation of the result of the experiment, for the difference between the tracing of the non-enervated kidney of a fevering dog and the enervated organ is too striking not to be at once apparent.

Whilst the former, as we have seen, approaches constantly the abscissa as the temperature rises, *the mean curve of the latter pursues an almost parallel course.*

Spinal Cord.—Still another method of severing the connection between kidney and brain remained, and that was to perform section of the cord, but, as was expected in the beginning, the results obtained in this manner were not so satisfactory as those afforded by the direct enervation. The possible connections between brain and kidney by way of the sympathetic are so numerous and complicated[1] that, no matter at what level the cord is cut, one can never be sure of being above the point of exit of all the supplying nerve branches. Section of the cord, even when performed low down, has also the disadvantage that the arterial pressure subsequently sinks to a very low point, and that a rapid fall of temperature occurs. In consequence the dogs stand the operation badly; death occurring two or three hours after.

In every case where section of the cord was made, however, results tallying closely with those cases of enervation where it could be fairly assumed that a certain number of nerves had escaped, were obtained. It was found that the kidney tracing remained almost uninfluenced by the rise of bodily temperature, and that, although the kidney could be made to slightly contract by applying a very powerful faradic stimulus directly to a bared nerve, as the median or sciatic, yet this reaction was almost nil when compared to that which takes place when the cord is intact.

Local Fever.—Further determinations regarding the central or peripheral origin of the renal contraction were made by causing a local fever, as

[1] Nöllner, op. cit.

it were, in the brain, whilst the kidney and the rest of the body remained of normal temperature. This was done by means of the apparatus invented by Goldstein for studying the dyspnœa of fever.[1]

This apparatus (see Fig. 3, No. 2) consists of a brass water-jacket fitting pretty closely around the carotid, and through which hot or cold water can be made to flow from vessels connected with it by rubber tubes. In order to insure a more prompt heating of the brain each carotid was provided with such a jacket, and the water was made to pass through both simultaneously. Between the hot jackets and the surrounding tissues several layers of thick, dry filter paper were laid which were found sufficient to prevent the vagus and other nerves being irritated by the heat.

Hot water of a measured temperature was allowed to run through for a certain length of time, a mark being made on the trace at the beginning and at the end. After the hot, some cold water was run through the brass jackets to cool them.

It was noted in all the experiments that in a few seconds after the hot water had entered the jackets the tracing registered a contraction of the kidney, while the general arterial pressure gradually rose. There was a latent period of varying length before the contractions began, and they lasted a short time after the hot water had been shut off and cold had been turned on, the kidney resuming then quite, or very nearly, its original volume and the blood pressure falling to its former height.

This reaction to a direct *central* irritation appeared so constantly and with such promptness that no misinterpretation of its significance was very well possible.

It may be remarked, by way of parenthesis, that we were fully able to corroborate Goldstein's observations regarding the dyspnœa that occurs during the temporary heating of the brain by hot blood, inasmuch as the appearance of rapid respiratory movements, becoming in some cases almost convulsive in nature, were regularly noticed every time the blood in the carotids was heated.

It might perhaps be urged that the change in the kidney was due reflexly to the sensation of asphyxia present, as shown by the dyspnœa, and of which the violent attempts at respiration were the exponent. That this however was not the cause, was proved by the arterial pressure remaining unchanged. Ordinarily, when asphyxia is produced, the general arterial pressure begins to rise a few seconds before the kidney begins to contract.

Taking the results of all the experiments made into consideration, we think it justifiable to draw the following conclusion :—

[1] Ueber Wärmedyspnoë, L. Goldstein. Arbeiten aus dem physiologischen Laboratorium der Würzburger Hochschule. A. Fick, 1872.

The decrease in the bulk of the kidney during fever is due to a contraction of its vessels which, in all probability, is the result of a stimulus conveyed to them from the central nervous system; the stimulus being the consequence of irritation of the central vaso-motor centres by the abnormally hot blood circulating through them during fever.

We have purposely said "in all probability," for Mosso,[1] in his investigations into the properties of the walls of the bloodvessels, has found that a contraction or dilatation of the vessels of extirpated kidneys takes place according as certain drugs, such as atropine, nicotine, etc. etc., are added to the blood with which these kidneys are fed. Still, however instructive these results may be from a purely physiological point of view regarding the vessels only, and not the kidney as a whole, they should hardly be considered as having too much weight when applied to the results of this research, because the kidney as it exists and functionates in the body of a living animal is, after all, a thing very different from one extirpated, even though the latter be kept, so to speak, *alive* for days, as in Mosso's experiment, by maintaining an artificial circulation through it. From this reason we refrained from repeating Mosso's experiments, and using hot blood, considering that no matter what the results might be they would be of little value in this case, in either proving or disproving the *central* origin of the vascular contraction.

General Conclusions.—From the experiments made we have proved:—

1. That in dogs with fever the kidney undergoes a diminution in its bulk.

2. That this diminution is due to a contraction of the walls of the bloodvessels; and,

3. That it is constant and progressive, being proportionate to the intensity of the fever.

4. That it is in all probability the result of a nervous stimulus, originating in the central (cerebral) nervous system from the irritation of abnormally hot blood circulating there.

From the intimate relations existing between the arterial pressure and the secretion of the urine, it will at once be evident that many of the changes occurring in the latter during fever may be readily explained by considering the above-named facts. Thus the *decrease in the amount of urine* secreted by fever patients, which has heretofore been ascribed to the increased loss of water through the lungs and skin (and which may amount to one-half,[2] or even a third,[3] of that normally secreted), becomes all the more explicable when the marked contraction is considered, which we have here shown that the renal vessels undergo during fever. For in this case

[1] A. Mosso. Von einigen neuen Eigenschaften der Gefässwand, Ludwig's Arbeiten, 1874.

[2] Cohnheim, Allgemeine Pathologie, vol. ii. p. 568, 2d ed. Berlin, 1882.

[3] Senator, Untersuchungen ü. d. fieberhaften Process. etc., p. 123. Berlin, 1873.

it is immaterial whether we accept the theory of Ludwig and his pupils, that the amount of urine secreted is dependent on the height of the arterial pressure in the kidney, or that of Heidenhain, that it is due to the rapidity of the blood-current in the renal vessels. In either case the great contraction of the kidneys' vessels would produce both a diminished blood-pressure and a retarded current within the organ, and hence a lessened secretion of urine.

The occurrence of *albumínuria*, such a constant symptom in nearly all high fevers, becomes readily understood when we bear in mind the extreme anæmia which we have seen affects the kidney during a hyperpyrexia. For nearly all authorities are now agreed that albuminuria is due to the glomerulal epithelium, in consequence of being insufficiently nourished with arterial blood, losing its function of retaining within the vessels the albuminous portions of the blood plasma.[1] The extreme sensitiveness of the renal epithelium generally to anæmia, whether partial or complete, has been shown by many observers,[2] and it is not surprising therefore, that in consequence of the prolonged and marked anæmia in the kidneys of fevering individuals, the epithelium should be so profoundly affected as to seriously impair its function, and allow it to become permeable to albumen.

It must be remembered that the foregoing experiments relate to fevers which, however high, were but of some hours' duration, and which would therefore come under the head of acute. It may not be out of place, however, to call attention to the fact that even in those cases of excessively high temperature, one example of which is recorded in Experiment No. 8, p. 393, where toward the close, when death was imminent, and it is probable that a general relaxation of all the vital functions was occurring, as is shown by the irregular and feeble action of the heart, and the presence of the marked Traube-Hering curves (Fig. 4, toward the end, at T. 42.4°), still, even in these instances, we say, the kidney remains in a state of complete contraction to the last. We point to this as having some analogy, perhaps, to cases of chronic fever, where what the temperature fails to attain by intensity, it makes up by quantity and duration; and that even in chronic fever the condition of the kidney, as regards its circulation, may possibly not be different to that in acute attacks. This is but a surmise which would need the test of further experiment to prove or refute.

Many other interesting questions to be solved in this connection present themselves. Thus, the actual measurement of the urine during an experimental fever to determine the mutual relations between the amounts secreted, the temperature, and the degree of contraction of the kidney.

[1] R. Heidenhain, Hermann's Handbuch der Physiologie, vol. v. p. 371, 1881. Cohnheim, Allgemeine Pathologie, 2d ed., vol. ii. p. 321, 1882.

[2] Max Hermann, Sitzgsber. d. Wiener Acad. Math. phys., Cl. lxv., 1861. R. Overbeck, same, lxvii., 1863. M. Litten, Untersuchungen über den hæmorrhagischen Infarct. Berlin, 1879; and others.

Then the relation between the renal circulation and the cutaneous. All these and many more require to be investigated before our knowledge of the renal circulation during fever will be in any sense complete. Incomplete in many ways as the author feels this research to be, he offers it as the first contribution toward the founding of an understanding of the renal pathology of fever based on experimental investigation, hoping it may be but the beginning of a series which will clear up this most important subject. For at present we have been groping in the dark, forced to content ourselves with theories based on analogies, and having actually no *positive* data based on experiment on which to found our views.

APPENDIX.—Although not strictly belonging here, we think it well to record the following observations noted in the course of the experiments :—

In a number of cases it was found that the arterial pressure rose with the increasing bodily temperature of the dog, a diminution occurring when the temperature had risen to a point incompatible with life, and when a general state of collapse had begun.[1] If, after the arterial pressure had risen in consequence of fever, the dog was cooled off, not only did the blood-pressure sink again, but the kidney increased in volume.

The following are some tables giving the amount of arterial pressure at different temperatures.

Experiment No. 8.—Thermic fever. May 25th, 1882.

Time.	Temp. of dog.	Arterial pressure.	Temp. of box.
12.20	38.8° C.	104 mm. of Hg.	46° C.
12.30	39.2	104 " "	46
12.55	40.2	112 " "	47
1.5	40.6	114 " "	47
1.15	41.4	116 " "	47
1.30	42	116 " "	49
1.45	42.4	130 " "	49
2	42.4	136 " "	48
2.7	43.3	140 " "	50
2.15	44	120 " "	49
2.20	44.2	112 " "	48
2.28	44.4	80 " "	50
3.10	Dog died.		

On inspecting Fig. 4, of Experiment No. 8, it will be seen that the Traube-Hering waves become very marked, and the individual heart-beats very small and frequent as the temperature approaches lethal limits, though the mean arterial pressure does not begin to fall until some time after both these phenomena have put in their appearance. It is highest at 42.4° C. (136 mm. of mercury), and then rapidly falls, being twenty minutes after, at the time of death, but 80 mm., the temperature being then 44.4°.

[1] Senator, Die Albuminurie im gesunden und kranken Zustande, p. 45. Berlin, 1882. See, also, Paschutin, Ludwig's Arbeiten, 1873, p. 229, and Zadek, Zeitschrift für klinische Medicin, vol. ii. p. 509.

Experiment No. 9.—Thermic fever. June 8th, 1882.

Time.	Temp. of dog.	Arterial pressure.	Temp. of box.	
1	37.8° C.	112 mm. of Hg.	...	
1.40	38.5	100 " "	48° C.	
2	39.5	110 " "	52	
2.16	40.2	120 " "	52	
2.25	40.8	130 " "	52	
2.40	41.8	144 " "	52	
2.50	42	172 " "	52	
3.10	41.1	134 " "	30	Box
3.15	41	140 " "	25	cooled
3.25	40.6	148 " "	24	off.
3.30	Dog died from hemorrhage from the carotid.			

In Experiment No. 9 a continuous rise of arterial pressure, going hand in hand with the increased bodily temperature, took place until the former registered 172 mm. at 42° C. The box being then cooled by allowing cold water to flow through it, the temperature of the dog fell, and with it the blood pressure; the kidney increasing in volume at the same time.

Experiment No. 24.—Pepsin fever. June 30th, 1882.

Time.	Temp. of dog.	Arterial pressure.	Respirations.	
11.15	36.9° C.	120 mm. of Hg.	...	
12.30	37.5	134 " "	...	
1.15	37.9	134 " "	...	
1.30	38.3	138 " "	...	
2.20	38.8	138 " "	...	
2.52	39.2	156 " "	...	
3.20	39.6	156 " "	...	
4.15	40	156 " "	...	
4.30	40.2	158 " "	...	
5.30	40.5	160 " "	130	
6.5	40.5	140 " "	180	
6.30	40.1	160 " "	34	Irregular.
6.40	40	160 " "	20	"
6.50	Dog killed.			

In Experiment No. 24 a continuous rise of arterial pressure took place to the end, when the dog was killed, the temperature being 40° C., and the arterial pressure 160 mm.

Experiment No. 25.—Pepsin fever. July 3d, 1882.

Time.	Temp. of dog.	Arterial pressure.
11.45	88.6° C.	124 mm. of Hg.
12.20	38.2	108 " "
1	38.7	116 " "
1.55	39.3	118 " "
3	40.2	126 " "
3.40	40.5	120 " "
4.50	41.2	140 " "
5.10	41.7	136 " "
5.55	41.9	120 " "
6.10	41.8	104 " "
6.20	Dog killed.	

Here the pressure increased till it was 140 mm. at 41.2° when it began to decline, the temperature still rising. At 41.8° the dog was killed, it having then sunk to 104 mm.

ARTICLE V.

CALCULOUS AND OTHER AFFECTIONS OF THE PANCREATIC DUCTS.[1] By GEORGE WOODRUFF JOHNSTON, A.M., M.D., Senior Assistant House Surgeon in the Woman's Hospital, New York City; late House Surgeon in the Hospital of the University of Pennsylvania, Philadelphia.

THE earliest writer who mentions the subject of Pancreatic Calculi is Regnero de Graaf, who wrote in 1671. Since then instances have been met with from time to time, and recorded with more or less accuracy by writers both in Europe and in this country, the most recent being a case under the charge of Dr. William Pepper, at the Hospital of the University of Pennsylvania, in 1880. Altogether we have been able to collect *thirty-five cases* in which, upon post-mortem examination, stony concretions were found in the pancreas. We cannot but believe that calculi are present in the pancreas far oftener than is supposed, and we can only attribute the paucity of medical literature upon the subject to the inexperience or carelessness of the diagnostician or pathologist.

In spite of the many difficulties which always attend the efforts of a collaborator, we have succeeded, we think, in obtaining a fair amount of material upon this subject, and we have endeavoured in these "Extracts" to summarize as much as possible the results of our work upon the pathological anatomy and symptomatology of calculous and a few allied affections of the pancreatic ducts.

I. PATHOLOGY AND MORBID ANATOMY.

1. *Varieties of Calculous Concretions found within the Pancreas.*—Before proceeding to a minute description of the calculous formations having their origin within the pancreas, it is well at the outset to refer briefly to the varieties into which such formations can be classed, and to mention—

a. Free concretions,

b. Calculous incrustations of the duct walls, and

c. "Acne pancreatica,"

as three general heads, under one or the other of which, all the instances of pancreatic calculi, contained in the reported cases, can easily be grouped. By far the greater number of stony formations observed belong to the class of free concretions; but the other two conditions, though rare, have been sufficiently well described to render the distinctions between the classes clear.

a. Free Concretions.—It is difficult to give any generalization based upon the observed cases of free concretions, as the older writers adopted

[1] Extracts from Inaugural Thesis, University of Pennsylvania, 1882.

the most arbitrary standards of comparison, and as the reports of later authors are to a great extent incomplete. We have attempted to record, in the form of a table, all the instances which it has been possible to collect, in such manner as will most clearly present their many differences and peculiarities to the eye of the reader. (See table, pp. 406 and 407.)

b. Calculous Incrustations of Duct Walls.—It occasionally happens that the inorganic constituents of the pancreatic juice, instead of being precipitated in the form of a free concretion, crystallize upon the walls of the ducts.[1] Calculous incrustations are thus formed, which occur as single points, or plates, or else layers covering the whole duct wall.[2] The origin of the two hollow concretions, described by Henry and Matani, can possibly be explained in this way,[3] although that mentioned by the latter seems to be more of the nature of a free concretion, and has been considered as such. And yet both were large, adherent to the interior of the pancreas, were hollow, and contained within their cavities a fluid (in the one case milky-white, in the other green), in which small granular concretions were suspended.

It is well known that one of the changes which occur in the walls of the so-called *kyste confirmé* is a chalky precipitation, sometimes so extensive as to cover its whole internal surface.[4] In one of the cases reported by Recklinghausen, the cyst found in the pancreas was beyond question the result of the complete occlusion of the duct of Wirsung (by a calculus), and its subsequent dilatation. The contents of this cyst were made up in great part of altered pancreatic secretion, and its walls were studded in some places with thick white plates; in others with grayish layers, which glistened like mother-of-pearl; while in others still they were covered only by a thin film.[5] It seems to us that this description agrees exactly with that already given of lime incrustations upon the inner wall of the pancreatic ducts, and it does not appear unlikely that we have here an example of such an incrustation formed simultaneously with the production of the calculus, and before any dilatation of the duct

[1] Klebs, Handbuch der Patholog. Anat., Berlin, 1876. Pankreassteine. 1 Bd., s. 544. .....Delafield, Handbook of Post-mortem Examinations and of Morbid Anatomy, New York, 1872: The Pancreatic Ducts, p. 203.

[2] Klebs, ibid.

[3] Matani, Naturen genees-kundige Bibliotheek—door Eduard Sandifort, Gravenhage, 1765: Waarneeming van Antony Matani, over eene steenagtige samengroejing van het alvleesch, in het lyk van een' mensche gevonden; or, Gottingische Anzeigen von Gelehrten sachen, No. 10, 1765. Antonii Matani observatio de lapidea pancreatis concretione in humano cadavere reperta.....Henry, Journal de chémie médicale, iv. série, Paris, 1855: Recherches analytiques sur une concrétion particulière du Pancréas, tome i. p. 273; or, France médicale et pharmaceutique, 3e Année, Paris, 1856: Sur les concrétions que présente le pancréas, No. 6, p. 42.....Klebs, ibid.

[4] Klebs, op. cit. s. 547.

[5] Recklinghausen, Virchow's Archiv, Berlin, 1864: Auserlerne pathologisch-anatomische Beobachtungen, I. Drei Fälle von Diabetes Mellitus, a. 30 Bd., s. 360.

Author.	Date.	No. of calculi.	Weight.	Size.	Shape and surface.	Colour.	Friability	Chemical analysis.	Remarks.
De Graaf,	1671	7 or 8	....	"Large as chick pea."					
Mercklin,[1]	1678	1	....	"Larger than an almond."	Irregular and sharp edges.	1 part black			
Eller,	1755	1	....	"Considerable."					
Gallati,	1758	20	....	"Little."					
Matani,	1765	1	℥ij	"Thick as little finger of full grown person."	Irregular, like a piece of coral.	White, yellow, coppery spots	.....	Fused, became black, lost weight. Soluble in aqua fortis and solution of silver, not in alkalies; *yellow* precipitate with Hg_2Cl_2.	Odour of foul water; no taste.
Fournier,	1776	9	....	.....	Triangular.				
Cawley,	1788	Pancreas full of calculi.	....	Varied; none larger than a pea.	Irregular, like mulberry stones	White			
Salmade, (Portal's 1st)	1797-8	12	....	Varied; some large as hazel-nut.	Round.	Whitish	.....	Powder freely soluble in hot water.	Taste flat and insipid like saliva.
Baillie,	1812 / 1833	A number.	....	Kernel of hazel-nut.	Irregular.	White	.....	Soluble in HCl; CO_2 extricated. Composed of carbonate of lime.	Pemberton, 1830, examined one of these, and found it composed entirely of carb. of lime.
Elliotson,	1833	Pancreatic and larger branch ducts crammed.	....	.....	.....	White			
Bigsby, Bonetus.	1835	4							
Schupman, 1	1841	1	℥iij ℈j	Length 1-6 lines; diam. 5-6 lines.	Cylindrical, irregular, covered with project'ns.	Grayish or yellowish white			
" 2	....	2	℈j	Length a few lines.	Irregular.	White			
Elliotson,	1846	100 at least.	....	.....	Similar to Baillie's drawings.				
Gould, 1	1847	In cyst wall several; in duct 3; tail filled.	....	Very minute; diam. 3-4 lines.	Rough.	.....	.....	Made up of carbonate of lime.	
" 2	....	Several.	....	Pea.					
Clayton,[2]	1849	Numerous; one escaped.	....	Length ⅔ inch.	.....	.....	.....	Carbonate of lime, traces of phosphate of lime, animal matters, and fat.	
Dufrêsne, 1 Portal's 2d	1851	In cyst many pan. and biliary cal.	....	Granular.	Unequal.	.....	Hard		

[1] In Mercklin's case, three large and several small pancreatic calculi were found in an abscess in right lumbar region.

[2] In Clayton's case, one pancreatic calculus escaped into peritoneal cavity; it was two-thirds inch long, and consisted of carbonate of lime, traces of phosphate of lime, animal matter, and fat.

Author.	Date.	No. of calculi.	Weight	Size.	Shape and surface.	Colour.	Friability	Chemical analysis.	Remarks.
2 Muhlbauer	....	In pancreatic abscess great variety of calculous matter.	....	From grain of sand to size of lentil.	.....				
Clark,	1851	Mass of calculous matter.	....	.....	Irregular and rough.	Glistening white	.....	Consisted probably of carbonate and phosphate of lime.	
Virchow,	1852	Twice met with concretions in excretory duct of pan.	....	.....	.....	.....	Half soft	Consisted probably of hard insoluble protein, which had great similarity of reaction with that contained in semen. Identical with the kind of albumin described by Bernard.	
McCready,	1856	1	....	Length 1 inch; diam. ½ inch.	.....	.....	.....	Composed of mixed carbonate and phosphate of lime.	
Recklinghausen, 1	1864	1	....	Bean.					
2(a)	....	Small particles of calculous matter suspended in whitish tenacious fluid.	....	.....	.....	.....	.....	Carbonate and phosphate of lime.	
(b)	....	2	....	(1) 1 inch long, ¾ inch thick. (2) 1½ inch long, ¾ inch thick. (3) Smaller particles.	Spindle-shaped. Granu'r surface distinguished later (2).	Grayish white	Brittle		
Cornil and Ranvier,	1869	Not specified.	....	.....	Irregular.	White	Friable	Carbonate and phosphate of lime.	The calculi were in a thick, white pulp, and probably wall incrusted.
Janeway,	1872	A number.	....	Small.	Irregular.	Whitish	Fragile	Probably of carbonate and phosphate of lime.	
Curnow,	1873	19. Ducts and smaller radicles studded.	....	Varied; length ½ to 1 in.; breadth ⅛ inch.	Worm-eaten appearance.	Whitish, when rubbed had enamel lustre; glistening, porcelain-like fracture	.....	Organic matter 24 parts. Fixed salts 76 parts. 100 parts. Chiefly carbonate of lime.	
Pepper, U.H. Reports	1880	Pancreas involved in a large tumour containing calculi.	....	.....	.....	.....	.....	.....	Along course of duct were cysts, some containing calculi.

NOTE.—The description of pancreatic calculi embodied in this Table are as far as possible in the words of the authors quoted.

occurred. If this is so, many of the incrustations found upon the inner wall of pancreatic retention cysts are the result of the precipitation of the inorganic constituents of the secretion upon the duct walls prior to their dilatation, and therefore should not be ascribed to the later changes occurring in the cystic walls, nor be compared to the results of a prolonged endo-arteritis.[1]

c. Acne Pancreatica.—The condition, sometimes met with in the pancreas, described by the pathologist Klebs, and called by him Acne Pancreatica, seems to have almost entirely escaped the notice of former investigators,[2] and Klebs himself fails to mention it in his article upon pancreatic concretions.[3] The pathological process involved consisted in a change of the normal pancreatic secretion into a fatty, chalky pap.[4] In the only case observed with any care, the exterior of the gland was covered by large light-yellow spots, which, like the acini, occupied a certain depth, and consisted of a thick, smeary, butter-like substance containing fat. The pancreatic duct was dilated and filled, as were the accessory ducts, with a pap-like mass, which contained pus elements and light particles of hardened protein.[5] Yellow spots similar to those above referred to, and having the appearance of blisters, were found by Klebs upon the surface of an enlarged pancreas. It is believed that these were cysts formed by the dilatation of the smaller branch ducts, and the clear or clouded semifluid mass which they contained was found to be composed partly of fat-globules, and partly of some cretaceous material. These spots may easily be mistaken for abscesses; for those small cysts which are only occasionally present in the acini, and are of no pathological importance; and, finally, for the small spots (from which chalk or tufts of fat-crystals can be expressed) found in a gland which has been the seat of chronic pancreatitis from obstruction of the portal vein.

Only a few other cases have been met with which seem to us illustrative of the condition just described, viz., acne pancreatica. In them either the pancreatic ducts were found full of a chalky powder,[6] of an earthy, doughy substance,[7] or else the whole gland was converted into a tophaceous

[1] Klebs, op. cit. s. 547.

[2] Klebs, op. cit. s. 547.....Gendrin, Histoire Anatomique des Inflammations, Paris, 1826: Pancréatites chroniques, tome ii. p. 263.

[3] Klebs, op. cit. s. 544.

[4] Gendrin, ibid.

[5] Virchow, Verhandlungen der med. physik. Gesellschaft zu Wurzburg, 1852: Zur pathologisch-anatomischen Casuistik, 4, III. Bd., s. 366, cf. II. Bd., s. 53.....Klebs, op. cit. s. 547.....Friedreich, Ziemssen's Encyclopedia of Medicine, New York, 1878: Diseases of the Pancreas, Cysts, vol. viii. p. 615.

[6] Wilson, Medico-Chirurgical Transactions, London, 1842: An account of a case of extensive disease of the pancreas, vol. xxv. p. 42.

[7] Schmitt, Zweifelhafte Schwanger, Wien, 1818.....Klebs, op. cit. s. 547.....Cornil et Ranvier, d'Histologie Pathologique, Paris, 1869–1873: Kystes, t. ii. p. 974.....Cornil and Ranvier, Manual of Pathological Histology, translated by Shakespeare and Simes, Phila. 1880: Cysts, p. 581.

or calculous mass.[1] It may be here remarked that the chemical composition of such deposits differs in no way from that of free concretions.

The cause of the formation of chalky masses or concretions in the pancreatic ducts, or in the small retention cysts above described, is without doubt either a chemical alteration, brought about in the secretion of the gland through contact with the inflamed duct walls, or else an obstruction offered to the free outflow of the secretion by a local interstitial inflammatory thickening, or a catarrhal swelling of the lining membrane of the duct of Wirsung, or of any of the accessory ducts. The question of causation will, however, be dwelt upon at greater length in a later section.

2. *Location of Calculous Deposits.*—The seat of the various concretions found within the pancreas can, we believe, be most clearly shown by the subjoined analysis. It may be mentioned, however, that, in the only instance of calculous incrustation of the duct wall in which the seat of this incrustation is specified, the part of the duct of Wirsung situated midway in the gland was alone affected. With regard to the condition spoken of as acne pancreatica, a sufficiently detailed description has been already given. We will proceed then to the remaining class, viz., Free Concretions.

Free Concretions.

	Seat.	No. of instances.
I. Found in duct of Wirsung only.	Exit	3
	Middle	1
	Tail	...
	Not specified	3
	Total	7
II. Found in branch ducts and in duct of Wirsung	Exit	...
	Middle	1
	Tail	1
	Throughout	7
	Not specified	2
	Total	11
III. Seat not specified	Total	3
IV. Found in abscess in pancreas	Head	1
	Centre	1
	Total	2
V. Found in cyst of pancreas	Head	3
VI. Exceptional cases	In abscess in right lumbar region	1
	In peritoneal cavity	1

[1] Meckel, Koreff, Dissertatio inaug. med. sist. theoret. consid. icteri. Halæ Magd., 1759, § 12, p. 16.

3. *Mode of Origin of Pancreatic Concretions.*—Although the origin of pancreatic concretions depends upon some special functional or structural alteration in or about the gland, yet we must consider these, in some cases, as the mere local manifestations of some general morbid condition. Disregarding the study of these general conditions, it will be necessary in the present section to refer to such local alterations only as are immediately connected with the production and development of these concretions. For the sake of clearness we will divide these alterations into two classes, namely: Changes in the gland itself, or in the chemical composition of its secretion; and Changes in the structure or relation of the surrounding tissues or organs.

Among the many modifications, both functional and structural, of which the pancreas is the seat, those only are directly connected with the formation of calculi which tend to prevent the free outflow of the pancreatic juice. A morbid change in any part of the gland structure,[1] especially at its head;[2] a mucus plug,[3] or an already formed calculus lodged in the duct of Wirsung or any of the larger ducts; a catarrhal[4] or chronic inflammatory condition with thickening of the same;[5] an interstitial inflammation with hyperplasia of connective tissue;[6] or a biliary calculus which has found its way into the pancreatic duct;[7] are some of the many causes which go far to explain the origin of pancreatic calculi. The conditions

[1] Rokitansky, A Manual of Pathological Anatomy, Syd. Soc., London, 1849: Abnormities of the different ducts and their contents, vol. ii. § 2, p. 180.....Portal, Cours d'anat. méd. Paris, 1803; Pancréas engorgé par des concrétions pieurreuses, t. v. p. 356.....Salmade, Recueil périodique de la Société de Médecine de Paris, 1797–98: L'observation à l'histoire des anévrismes, tome iii. p. 454.....Dufrêsne, Traité de l'affection calculeuse du foie et du pancreas, Paris, 1851: Article deuxième, p. 494..... Schupman, Hufeland's Journal, 1841, iii. Geschichte einer scirrhösen Hypertrophie der Leber und des Pankreas, etc., xcii. Bd., s. 41.....Wilson, loc. cit.....Curnow, Trans. Path. Soc., London, 1873, 23: Pancreas with numerous calculi in its ducts, vol. xxiv. p. 136.....Muhlbauer, Neue Notizen (von Froriep) Weimer, 1822–1847.....Devilliers, Revue médicale, Décembre, Paris, 1844, tome iii. p. 576.....Eller, Collection Académique, Paris, 1755. Recherches sur la formation des pierres ou concrétions, gravaleuses dans le corps humain, etc. Partie Etrangère, tome x. p. 85.....Sandifort, Observationes anatomico-pathologicæ, Lugd. Batav., 1777. Lib. iii. cap. iv. p. 73..... Virchow, loc. cit.

[2] Cawley, London Medical Journal, 1788: A Surgical Case of Diabetes, etc., vol. ix. part iv. p. 286; also Sammlung Auserlerner abhand., Leipsig, 1789, 13 Bd., s. 112..... De Graaf, Tractat anat. med. de succi pancreatici natura et usu., Ludg. Batav., 1671, cap. vii. p. 112.....Lieutaud, Hist. Anat. Med., Paris, 1767, liber i. § viii. obs. 1045, p. 244.....Janeway, New York Medical Record, 1872: A case of Calculi of the Pancreas, etc., vol. vii. p. 357.

[3] Rokitansky, ibid.

[4] Curnow, ibid.....Friedreich, op. cit. p. 615, and Calculi, p. 618.....Klebs, op. cit. s. 547.....Parsons, British Medical Journal, 1857, vol. i. p. 475.

[5] Recklinghausen, op. cit. b. Concretionen, Ektasien des Ductus Veröderung des Parenchyms des Pankreas.

[6] Delafield, op. cit. p. 202.....Friedreich, op. cit. p. 615.....Parsons, loc. cit.

[7] Klebs, op. cit. s. 544.....Delafield, op. cit. p. 203.

are varied, it is true; the effects the same. Let there be an obstruction, a compression, a complete occlusion of the duct internal to the gland, and the secretion is dammed back, it accumulates and stagnates when it should escape, and those conditions most favourable to the precipitation of its inorganic constituents are all thus furnished. But who can say that there are not other and more remote causes, in addition to those which have been already mentioned? Is compression or complete occlusion of the ducts necessary? In atrophy, in morbid softening, especially in fatty metamorphosis of the gland structure itself, and lastly in scirrhoid induration, the tissue of the duct becomes involved, the vital contractility is lost, dilatation ensues with stagnation of the secretion,[1] and the same effect is brought about in an entirely different manner. Instead of dilatations and cysts being the result of duct occlusion, by a stone already formed, they have here become the cause of its formation, and yet it is in some cases most difficult to say, from a study of pathological appearances, which is the cause, and which the effect.[2]

It is clear, then, that an obstruction to the free outflow of the pancreatic secretion will cause retention and accumulation of that fluid within the ducts of the gland, and thus favour the precipitation of its inorganic constituents. But it is possible that the secretion may become so altered in the nature or relation of its chemical components, as to bring about a deposition of its inorganic elements, without any preliminary obstruction or dilatation of the gland ducts. From a study of the reported cases of calculous disease of the pancreas, it will be seen that in many instances calculi have been found within the gland *where no obstruction of the ducts had existed*, such as described in the foregoing and succeeding pages.[3] It now, therefore, remains to be seen what are the changes in the pancreatic secretion which result in the formation of calculi, and how these changes are brought about. By a comparison of the chemical constitution of the normal pancreatic juice with that of pancreatic calculi, one will be struck by the following facts: In three analyses given of the former, lime, whether in combination with organic matter, or as free phosphate of lime,

[1] Rokitansky, loc. cit.

[2] Gould, Catalogue of the Anatomical Museum of the Boston Society for Medical Improvement, Boston, 1847: Several pancreatic calculi, extensive disease of the pancreas, §§ 575–6, p. 173.....Dufrêsne, loc. cit.

[3] Matani, loc. cit.....Baillie, The Morbid Anatomy of the Human Body, London, 2d ed. 1812, p. 115, and, London, 1833, Calculi of the Pancreas, p. 222.....Elliotson, The Principles and Practice of Medicine, 2d ed., London, 1846: Diseases of the Pancreas, p. 1009; also, Medico-Chirurg. Trans., London, 1833, on The Discharge of Fatty Matters from the Alimentary Canal and Urinary Passages, vol. xviii. p. 67.....Bonetus, vide Bigsby, loc. cit.....Gould, op. cit. § 575.....Clayton, Medical Times, London, 1849: A case of Calculi of the Pancreas, etc., vol. xx. p. 37.....Henry, loc. cit..... McCready, New York Journal of Medicine, 1856: A case of Pancreatic Calculi, in Proceedings of Patholog. Soc. p. 78.....Recklinghausen, op. cit. 1, a. p. 360.....Cornil et Ranvier, loc. cit.....Cornil and Ranvier, trans. loc. cit..... Schmitt, loc. cit.

is present only in very small amount, or, as in a fourth analysis, is not mentioned at all; whereas, in the various chemical examinations made of the latter, lime, both as a phosphate and as a carbonate (an element not found at all in normal pancreatic juice), is present in very large amount, and forms either the entire calculus,[1] or else by far the greatest part of it.[2] In addition to the carbonate of lime already mentioned, three other inorganic substances have been found in pancreatic calculi, which, according to the analysis above referred to, have no place in the pancreatic juice; they are the chlorate of sodium,[3] carbonate of magnesium,[4] and oxalate of lime.[5]

In conclusion, let us bear in mind the close analogy which exists between the pancreas and its kindred salivary glands, in both of which calculi are found, produced by the same general causes, and followed by the same effects.[6] How does the chemical composition of salivary calculi compare with that of the salivary fluid? It has been remarked, that the saliva from which salivary calculi are formed, must be in an unhealthy state, for, while these concretions consist chiefly of phosphate of lime, sometimes containing as much as ninety-four per cent. of that salt, little, if any, is to be found in the normal salivary secretion.[7] From this it is clear, that in true salivary calculi, as in those of pancreatic origin, the quantity of the salts of lime is much greater than in the fluids secreted by these glands. The means, by which the pancreatic secretion is so changed inside the body as to bring about a precipitation of its inorganic constituents, must still remain a matter of doubt. Various explanations have been advanced, but none are entirely satisfactory. It is possible that physiological variations are occasionally present in

[1] See in Table of Free Concretions. Baillie, Gould, and Collard: Henry, La France Méd. et Pharm., op. cit. p. 42.....Pemberton, on Various Diseases of the Abdominal Viscera, Richmond, Va., 1830: chap. iv. The Pancreas, p. 64.

[2] See in Table of Free Concretions: Clayton, Clark, McCready, Recklinghausen, Cornil and Ranvier, Janeway, Curnon; also, Wilson, loc. cit., Rokitansky, loc. cit.....Gross, Pathological Anatomy, Phila. 1845: Of the pancreas, chap. xxiv. p. 689.....Henry, La France Méd. et Pharm., loc. cit. p. 42.....Wollaston, see Pemberton and Henry, ibid.

[3] Henry, ibid.

[4] Henry, Journal Méd. et Pharm., loc. cit.

[5] Golding Bird (See Wilks & Moxon, Lectures on Pathological Anatomy, Phila. 1875: Diseases of the Pancreas, Calculi, p. 470).

[6] De Graaf, loc. cit., Eller, loc. cit., Matani, loc. cit., Rokitansky, loc. cit., Henry, La France Méd. et. Pharm., loc. cit.; Friedreich, op. cit. p. 618; Wilks & Moxon, loc. cit., Portal, loc. cit.....Bécourt, Recherches sur le pancréas, Thèse, Strasbourg, 1830: Concrétions inorganiques, § 5, p. 69.....Mondière, Archives Générales de Médecine, ii. Série, Paris, 1836: Recherches pour servir à l'histoire pathologique du pancréas, tome xii. p. 147.....Bigsby, Edinburgh Medical Journal, 1835: Observations on Diseases of the Pancreas, vol. xliv. p. 97.....R. D., Dictionnaire de Médecine, Paris, 1841: Maladies du Pancréas, concrétions osseo-pleurreuses, tome xxiii. p. 65.

[7] Jones & Sieveking, A Manual of Pathological Anatomy, Phila. 1854: Abnormal conditions of the pancreas and other salivary glands, p. 532.

the composition of the pancreatic juice, as in the secretion of other salivary glands, in which occur temporary changes in quantity, in colour, in consistency, and, as indicated by the taste and alkaline or acid reaction, in chemical constitution.[1] Further, local changes in the tissue of the secreting portion of the pancreas,[2] or in that of its ducts, may produce such an influence upon the secretion as would lead to the crystallizing out of its less soluble salts. It has been said that the excess of phosphate of lime present in calculi is most probably caused by an irritation or inflammation of the mucous membrane lining the ducts,[3] and if this be true, there can be but little doubt that an excess of this phosphatic salt, which, as we have seen, is present in nearly all pancreatic calculi, can be formed in like manner in the ducts of the pancreas.

It seems proper, before leaving this part of our subject, to record in brief the chemical analyses made of two pancreatic calculi, which, for obvious reasons, are not to be found in the list of free concretions,[4] with the analyses of two salivary calculi, in order to illustrate the close analogy which is said to exist between pancreatic and the so-called salivary calculi.

1.[5] A pancreatic calculus, wt. 9.06 gm., contained—

Phosphate of lime	72.30
Carbonate of lime	18.90
Phosphate of soda	traces
Chlorate of sodium	"
Animal matter	8.80
In	100.00 parts.

2.[6] A pancreatic calculus found in canal of Wirsung of an ox contained—

Carbonate of lime	91.65
Carbonate of magnesium	4.15
Organic matter	3.
Water	1.20
In	100.00 parts.

3.[7] A salivary calculus found in Steno's duct of a woman contained—

Phosphate of lime	55
Carbonate of lime	15
Animal matter	25
Oxide of iron	2
Magnesium	traces
Waste	3
In	100 parts.

[1] Rokitansky, loc. cit.....Friedreich, op. cit. p. 618.

[2] Recklinghausen, op. cit. i. b.

[3] Recklinghausen, ibid.....Jones & Sieveking, loc. cit.

[4] Henry, Journal de Chémie Médicale, op. cit. p. 273.

[5] Henry, Journal Méd. et Pharm., loc. cit.

[6] Schulze, Journal für p. Chemie, xxxix. p. 29: Rap. an de Berzelius, 1848, p. 412: cf. Henry, ibid.

[7] Lassaigué, Traité de Chémie, tome ii. p. 614: cf. Henry, ibid.

4.[1] Another salivary calculus contained—

Phosphate of lime	75.
Carbonate of lime	20.
Animal matter Waste	5.
In	100 parts.

The changes in the parts or tissues adjacent to the pancreas, which are of force in the production of pancreatic calculi, are as numerous and as varied as those within the gland itself. Yet we will find the same thing here as there, different causes with like effects; an obstruction to the free escape of the pancreatic secretion, a stagnation, an inspissation, and the formation of a calculus, with all the train of phenomena attending thereon. And we repeat here what has been said in a former section, not only that calculi, by occluding the pancreatic ducts, cause their dilatation and the formation of retention cysts; but that these cysts, whether so formed or not, favour in their turn the production of calculi,[2] and that, therefore, whatever causes are assigned for the development of retention cysts can also be considered as secondarily productive of calculi. From a careful study of the cases of pancreatic calculi which we have collected, we find no instances in which the production of a concretion has been caused by compression of the excretory duct through changes outside of the gland; nevertheless, since such compression is possible, and may have been overlooked, we cannot refrain from briefly referring to some of the changes whereby it may be brought about. Among these may be mentioned peripancreatic induration and adhesions, especially near the head of the gland;[3] gall-stones lodged in the common duct and pressing upon the duct of Wirsung;[4] a cancerous growth in the duodenum;[5] and, finally, changes, as the result of which the pancreas becomes displaced.[6]

4. *Mode of Escape of Pancreatic Calculi.*—Pancreatic calculi may escape into the duodenum, accompanied by a paroxysm of pain or colic, similar to that which attends the passage of biliary or of renal calculi.[7] This, instead of being only a probable method of escape,[8] is, we believe, not at all infrequent.[9] No case in which a direct observation has been made can, however, be brought forward in proof of this assertion. As will be

[1] Lecannau, Journ. de Pharm. et de Chir., Décembre, 1827, p. 626.

[2] Virchow, Die Krankhaften Geschwülste, Berlin, 1863, i. Bd., s. 276.....Friedreich, op. cit. p. 615.

[3] Hoppe, Virchow's Archiv, 1857, xi. Bd. s. 96: cf. Friedreich, ibid.

[4] Engel, Oesterreich med. Jahrbücher, 1841: xxiii. u. xxiv. Bd.

[5] Friedreich, op. cit. pp. 601–15. [6] Engel, ibid; Friedreich, ibid.

[7] Friedreich, op. cit. p. 618.

[8] Ancelet, Essai Analytique sur l'anatomie pathologique du Pancréas, Thèse, Paris, 1856, tome i. p. 27.

[9] Pemberton, loc. cit., Portal, loc. cit.: cf. Dufrêsne.....Schupman, loc. cit., Wilson, loc. cit., Clayton, loc. cit.

discussed in a later section, it is almost impossible to tell from symptoms whether a pancreatic or biliary calculus is being passed, nor is it easy to recognize pancreatic concretions in the stools. It is, nevertheless, possible that in many of the cases which we have collected where, during life, pain, more or less characteristic, was present, and after death pancreatic, but no biliary calculi, were found, nature had sought this mode of relief.[1]

It is known that calculi, acting as foreign bodies within the pancreas, sometimes give rise to inflammation and ulceration, with subsequent perforation of the gland substance. In one reported case perforation was found at the post-mortem examination, and, although several calculi had remained in the pancreas, one had escaped into the abdominal cavity. The patient's death was attended with symptoms denoting internal hemorrhage, and a large quantity of coagulated blood was found within the peritoneal sac.[2] In another case, the record of which is rather obscure, one concretion was found in the pancreas, and several others in an abscess, situated in the mesentery and opposite the point (the right lumbar region) where, during life, the patient suffered the greatest pain.[3] Although no lesion of the pancreas was noted, it is not unlikely that the calculi escaped in the same manner as is mentioned in the last case. A later writer describes this abscess as peri-pancreatic, but we do not think that the original account warrants this construction.[4]

5. *Results following the Impaction of Calculi in the Ducts of the Pancreas.*

a. Dilatation of ducts and formation of cysts.

Hemorrhagic cysts.

Hemorrhage into the pancreas.

Dilatation of the ducts of the pancreas, with or without the subsequent development of cysts, is one of the results which most often follow the formation of calculi within the gland.[5] Virchow, having in mind the close analogy (already pointed out) which exists between the pancreas and the salivary glands of the mouth, has given the name Ranula Pancreatica

[1] Wilson, loc. cit.....Mercklin, Ephem. nat. cur. decur., Frankfort und Leipsig, 1678: De ingen. calc. in mesen. et pan. repert, Ann. 8, obs. 50, p. 78.....Galiati, De morbus duobus observ. 1758, p. 26; or Comment. Bonon, tome iv. p. 34. (NOTE.—It has been impossible to gain access to these two works. The case is quoted by Sandifort, Mondière, R. D., Bécourt, and by others.) Elliotson, Med. Chirurg. Trans., loc. cit.....Schupman, loc. cit., Gould, loc. cit., Clayton, loc. cit., Dufrêsne, loc. cit. .....Clark, London Lancet, Aug. 16, 1851: A case of disease of the pancreas, etc..... Fournier, Anc. Journal, tome xlv. p. 149; or, more correctly, the journal being better known under its more recent name, Journal de médecine, chirurgie, pharmacie, Paris, 1776, tome xlv. p. 149.

[2] Clayton, loc. cit.

[3] Mercklin, ibid.

[4] Klebs, op. cit. s. 544.

[5] Matani, Baillie, Schupman, Gould, Rokitansky, Dufrêsne, Clark, Virchow (Verhand. der Med. physik. iii.), Ancelet, Recklinghausen, Cornil & Ranvier, Janeway, Curnow, Fournier, Meckel and Delafield.

to all dilatations of the pancreatic ducts leading to the formation of cysts.[1] This dilatation of the ducts of the pancreas is due to a distension of their walls by the mechanical pressure of a retained secretion. The degree of dilatation, other things being equal, is in direct proportion to the completeness of the obstruction to the outflow of the pancreatic juice. Although a calculous concretion is one of the usual and most effective causes of this obstruction, nevertheless many other changes, both within and without the gland, undoubtedly produce the same effect. These alterations have been already briefly referred to,[2] but many others exist which it is not our intention at present to describe.[3] It suffices to say, given an impediment, complete or partial, to the free escape of the pancreatic secretion, and the most natural result is a mechanical distension and dilatation of the ducts behind the obstructed point.

Among the cases of pancreatic calculi collected, dilatation of the main duct is the result of obstruction the most frequently observed. Generally, this dilatation represents only an exaggeration of the normal calibre of the duct, which throughout the greater part of its length is more or less uniformly dilated.[4] If, however, the obstruction is near the point of exit into the duodenum, and is complete and continued, the dilatation does not cease here, but the accessory ducts in their turn become enlarged,[5] presenting the appearance of diverticula, opening into the duct of Wirsung, and separated from one another by valvular folds or transverse ridges, formed by the coats of the ducts, which may be either thickened or attenuated.[6] Again, instead of these close-set expansions, there may exist at intervals single fusiform dilatations.[7] It is possible for the accessory ducts to undergo dilatation without the involvement of the main duct. Thus they may become closed at their exit by the presence of a calculus, by local interstitial inflammatory thickening, or by catarrhal swelling of their lining membrane, with or without the collection of a stringy catarrhal secretion, the main duct remaining patent throughout. The degree of dilatation, depending as it does upon the conditions already pointed out, varies considerably in different cases. We have the size of the dilated main duct compared to that of a quill,[8] of the thumb,[9] it is said to be

[1] Virchow, Die Krankhaften Geschwülste, loc. cit.....Parsons, British Medical Journal, June 15, 1857, vol. i. p. 475.

[2] Reference may here be made to the section on the Mode of Origin of Pancreatic Concretions.

[3] Klebs, loc. cit.: Cysts, p. 547.....Friedreich, loc. cit.: Cysts, pp. 600–15.....Parsons, loc. cit..... Cornil & Ranvier, loc. cit.: Kystes, p. 974 : Trans. Cyst., p. 581..... Virchow, loc. cit.....Ancelet, loc. cit.: Kystes, p. 26.....Rokitansky, loc. cit.....Cruveilhier, Traité d'anatomie pathologique générale, Paris, 1856 : Kystes Pancréatiques, tome iii. p. 365.

[4] Klebs, op. cit. s. 547.....Meckel, Baillie, Gould (op. cit., § 575), Rokitansky, Virchow, Ancelet, Recklinghausen, and Cornil et Ranvier.

[5] Matani, Janeway, and Curnow.

[6] Klebs, Rokitansky, Friedreich, and Recklinghausen.

[7] Rokitansky. [8] Rokitansky. [9] Matani.

dilated,[1] much dilated,[2] or prodigiously dilated.[3] In one case only was an accurate measurement made, when the diameter of the duct was found to be one inch.[4]

The study of the cysts, or, as the Germans are pleased to call them, *Ektasien*, resulting from an extensive and continuous impediment to the outflow of the pancreatic juice, is an extremely interesting one, and will be briefly alluded to as one of the many results following the impaction of concrements. All such cysts found in the pancreas belong purely to the class of retention cysts, and although in some cases extensive secondary changes seem to render their origin doubtful, yet it is comparatively easy to exclude pouches beginning outside of the pancreas, even though pushing aside its glandular tissue, and entering into communication with its duct, aneurismal dilatations of arteries in the gland, and, finally, cysts originating from entozoic formation.[5]

Cysts of the pancreas present many varieties in form and size, have been studied with some care by pathologists, and are of the utmost symptomatological importance. Two distinct classes are met with: those which emanate in an extreme degree of dilatation of the main duct of the pancreas, and the small multiple cysts originating from a similar dilatation of the small ducts within the acini, or of the terminal vesicles of the gland. The former sometimes attain an immense size, in one case measuring three by four inches;[6] in others compared to the size of a child's head.[7] Their form is generally spherical or oval,[8] but varies extensively in different cases.[9]

Whereas, in ordinary dilatation of the main or of the accessory ducts of the pancreas, and also in the first period of the history or development of a cyst, there is a simple retention of the secretion without any notable alteration in the walls of the duct or cyst, or in the secreting structure of the gland itself, yet, in the second period, in the *kyste confirmé*, changes occur which cannot be passed over unnoticed. Here the cyst walls become thick, fibrous, tough, cartilaginous, or even ossified. Their internal surface may be smooth, or may present changes similar to those which occur on the internal surface of arteries, namely, fatty or chalky precipitations or aggregations, such as are seen in the later stages of endoarteritis. In other instances the walls of very large or old cysts become the seat of albuminoid or of purulent infiltration. The mischief does not however stop here; the constantly enlarging cyst, with its thickened and hardened walls, encroaches upon the substance of the gland itself, and the

[1] Ancelet, Janeway. [2] Curnow. [3] Baillie.
[4] Gould, op. cit. § 575.
[5] Recklinghausen, op. cit. i. a. [6] Gould.
[7] Recklinghausen, Ancelet, Bécourt.....Duponchel, Soc. Méd. d'Émulation, Paris, 1824, tome ix. p. 76.
[8] Recklinghausen, Gould. [9] Krebs, Friedreich, etc.

result of this pressure is seen in morbid alterations of the gland parenchyma. Through chronic interstitial growth and induration the entire gland structure, even to its last acinus, atrophies, loses its function, and is completely destroyed, or again is entirely replaced by adipose tissue.

The nature of the contents of pancreatic cysts varies so constantly that it would be impossible to embody in any one description all of the peculiarities met with. In some cases cysts were found filled with the altered secretion of the gland; in others, with a pure mucus; again, with a serous fluid; but, in a large proportion, products of retrograde tissue metamorphosis, broken-down cells, choiesterin crystal, purulent matter, or blood extravasations, with crystals of hæmatoidin, were present.[1]

Lastly, as has been already mentioned, calculous concretions are sometimes formed within old pancreatic cysts. Under the head of Acne Pancreatica, the contents of small cysts have been described at sufficient length in a former section.

The quantity of fluid present in a cyst will, of course, vary with its size; the largest amount of which we have record was between ten and fourteen ounces.

Many and varied are the changes induced in the surrounding tissues and organs by the presence of pancreatic cysts; in fact, the contents of both the epigastric and hypochondriac areas may become more or less involved by the proximity of the diseased structures, and present the most remarkable variety of pathological processes. Those which most properly concern us are such as will, if accurately understood, be of use in enabling us to recognize during life the seat and nature of the disease. These lesions are, as a rule, simply the result of pressure, and will necessarily vary with the size and situation of the tumour. And, again, as an aneurism of the thoracic aorta, by pressing upon the trachea, without necessarily causing any alteration in its structure, will produce marked if not fatal symptoms; so a cyst of the pancreas, by mechanical pressure alone, will endanger if not end life. The changes which are ordinarily found consist, in the majority of cases, in the formation of morbid adhesions, from which the most singular distortions result. None of the contents of these regions escape implication. The portal vein,[2] inferior cava,[3] and splenic vein;[4] the pylorus,[5] duodenum,[6] colon,[7] gall-bladder, and biliary passages;[8] the stomach,[9] liver,[10] spleen,[11] and right kidney;[12] and, lastly, the solar plexus of nerves;[13] may all be structurally involved or locally displaced, rendering diagnosis most difficult, and post-mortem examination most unsatisfactory.

[1] Pepper, Centralblatt für die Med. Wissench. 1871, p. 156.
[2] Dufrêsne, Recklinghausen.
[3] Dufrêsne, Klebs.
[4] Recklinghausen.
[5] Fournier.
[6] Gould, Dufrêsne, Fournier.
[7] Fournier, Parsons.
[8] Dufrêsne, Fournier.
[9] Gould, Recklinghausen.
[10] Gould.
[11] Recklinghausen.
[12] Fournier.
[13] Recklinghausen.

In the positions occupied by cystic enlargements of the pancreas, there is not enough similarity to enable us to deduce any clinical laws. Thus the tumour may be situated below the right lobe of the liver, and between the intestines and the posterior wall of the abdomen,[1] at the entrance of the common duct into the duodenum,[2] between the left end of the stomach and the upper end of the spleen,[3] midway in the pancreas,[4] or in the left hypochondrium.[5] Finally, with regard to their termination, large pancreatic cysts may rupture, their contents being discharged into the duodenum, stomach, or peritoneal cavity, and so cause death.[6]

Before closing our remarks upon cysts of the pancreas, the subject of hemorrhagic cysts is deserving of notice, and with it will be incorporated a short account of hemorrhages into the pancreas, for, owing to the close analogy which exists between these two conditions, it is thought desirable to discuss them together.

Old pancreatic cysts frequently contain more or less blood (generally disorganized, and of a chocolate-brown colour), which, if coagulated, constitutes the so-called hæmatoma.[7] On the other hand, fresh, red extravasations are occasionally met with. It is necessary, in speaking of hemorrhage proper, to distinguish between that form which results from a passive congestion of the gland, dependent upon some cen ral obstructive disease, along with chronic inflammatory changes in the vascular system,[8] and hemorrhages which take place into the gland, the result of the rupture of vessels which have undergone a primary fatty degeneration.[9] These constitute the so-called apoplectiform hemorrhages into the pancreas. The second of these conditions is admirably illustrated by three cases, the report of which was published in a foreign journal a few years since.[10] In the first the individual was apparently in perfect health; in the second, an epileptic, otherwise healthy; in the third, a drunkard. They were all quite corpulent. In each case death occurred suddenly, and without apparent cause, while after death extensive fatty degeneration of the pancreas was observed. The hemorrhage in one case was more of the nature of a bloody infiltration of the gland substance. In another the infiltration was also observed around the gland; while in the third there was a somewhat extensive hemorrhage into the pancreas. In two of these cases there was also an effusion of blood into the duodenum. Since the quantity of extravasated blood was in no case sufficiently large to bring

[1] Gould. [2] Dufrêsne. [3] Clark.
[4] Recklinghausen. [5] Parsons. [6] Friedreich, Pepper, Klebs.
[7] Klebs, Ancelet, ann. med. Störk, Vin. Wien, 1757, Gould, Duponchel, Clark, Pepper; Gros, Archives Gén. de Méd., Paris, 1849, IVe série, vol. xix. p. 215.
[8] Friedreich, Störk; Rugg, London Lancet, May 18, 1850: Fatal Hemorrhage from Pancreas.
[9] Friedreich.
[10] Zenker, Tagblatt der 47 Versammlung deutsches Naturforscher und Aerzte in Breslau, 1874, s. 211.

about speedy dissolution from hemorrhage, *i. e.*, direct loss of blood; and since in each case great hyperæmia of the semilunar ganglion was noticed, without structural alteration in nerve cells or fibrillæ, the cause of instantaneous death is explained on the theory, that the suddenly enlarged pancreas, by pressure on the semilunar ganglion, and solar plexus of nerves, produced an immediate arrest of the heart, by a reflex inhibition exerted through the vagus nerve, as in Goltz's familiar experiment with the frog.

6. *Inflammatory Changes.*—Of those secondary conditions which are the result of the presence of calculi within the pancreas, duct dilatation and cyst formation are certainly the most interesting when viewed from a pathological standpoint; and, moreover, when excessive, by revealing to the diagnostician the presence of a local swelling, serve to explain many obscure and intractable symptoms. But, while acknowledging the greater interest of that part of our subject, it is necessary to enumerate at least the alterations of structure which result when the pancreas becomes the seat of stony concretions. These are in the main similar, when considered as mere pathological processes, to changes occurring in any other gland, and depend primarily upon inflammation. The pancreas may thus become the subject of acute, subacute, or chronic inflammatory processes; those which to us are of the greatest interest being the acute, suppurative, and the chronic interstitial inflammations. There is no doubt that the duct-wall first becomes the seat of change, and a condition is described in which it was found thickened, through an increase in the surrounding connective-tissue substance, its lining cells having undergone marked alterations.[1] No accurate description of duct inflammation resulting from the irritation produced by a calculus is, however, given by systematic writers. Dr. Roland G. Curtin, of Philadelphia, has reported a case of what he believes to have been a primary catarrhal inflammation of the ducts of the pancreas.[2] The microscopic examination of the specimen showed a condition of things not very dissimilar to the description just given. Dr. Curtin suggests, however, that the inflammatory process may have begun in the duodenum, and from thence involved the pancreatic duct secondarily, this theory being borne out by the fact that during life symptoms of intestinal derangement preceded any evidences of pancreatic obstruction. Whether a primary catarrhal inflammation of the pancreatic ducts is possible, must of course remain an open question; but that such an inflammation, whether primary or secondary, will give rise to subsequent changes in the pancreas, should it affect the duodenal end of the duct of Wirsung

[1] Cornil and Ranvier, loc. cit.

[2] A Contribution to the Pathology and Therapeutics of the Pancreas. A paper read before the Pennsylvania State Medical Society, 1881, by Dr. Roland G. Curtin, of Philadelphia.

alone, or be confined to the smaller branch ducts, is a fact proven by the case of Dr. Curtin, and by the results recorded by other investigators.

It is possible, though of rare occurrence, to have an inflammation accompanied by deposits of purulent matter in the gland structure. We have been able to collect but three cases in which this condition was the result of the presence of calculi. In one, the head of the pancreas was merely touched with points of ulceration;[1] in a second, an abscess of the size of a nut, containing much purulent matter and many calculi, was found in the centre of the gland;[2] while in a third, a very large abscess, containing calculi, and having for its walls the dilated head of the gland, was discovered.[3] Such abscesses may open in any direction; the second referred to discharged a part of its contents into the stomach through a hole the size of a thumb.

A chronic interstitial inflammation of the pancreas is described, which by hyperplasia of connective tissue may lead to hypertrophy, atrophy, induration, and fatty degeneration. The condition of hypertrophic cirrhosis is rare. Atrophic cirrhosis is common, and the induration accompanying it is marked. This induration, which may give to the gland a feeling of cartilaginous hardness, has very often been confounded with scirrhus, so that in many cases of supposed cancerous disease, there is no doubt that the real lesion was one of cartilaginous induration.[4]

a. Fatty Changes.—In speaking of fatty disease of the pancreas, a distinction must be drawn between the condition known as lipomatosis and the true fatty degeneration, or *transformation graisseuse.* In the first of these, fat develops in the interacinous connective tissue, or else on the periphery of the gland, pushes its way in, and produces atrophy and even complete destruction of its proper secreting structure, the whole gland being converted into a mass of fat.[5] The second is a true fatty metamorphosis, beginning in the gland cells, and leading to complete destruction of the acini and subsequent atrophy of the whole viscus.[6] These two conditions are to a certain extent inseparable, and since no microscopic examination was made, it is impossible to say whether, in the two reported cases of pancreatic calculi in which fatty changes in the gland were the result, fatty infiltration or fatty degeneration existed alone or together.[7]

[1] Dufrêsne. [2] Muhlbauer. [3] Fournier.

[4] Cawley, Salmade, Schupman, Friedreich, and Klebs.

[5] Maier, Archiv der Heilkunde, Leipsig, 1865; Fall von ausgezeichnete (r) Verfetlung der Pankreas, s. 168.....Klebs, op. cit. s. 562.....Friedreich, op. cit. p. 624. .....Cornil et Ranvier, op. cit. tome ii. p. 970: Dégénérescence graisseuse.....Bécourt, op. cit. p. 50.

[6] Jones, Med.-Chirurg. Trans., London, 1855: Observations respecting Degeneration of the Pancreas, p. 195.....Salter, Encyclopædia of Anatomy and Physiology, Part XLIV.....Rokitansky, Lehrbuch der Patholog. Anat., 1861, iii. s. 313, 369.....Bécourt, op. cit. p. 50.....Ancelet, op. cit. p. 29.....Bock, Lehrbuch der Pathol. Anat., Leipsig, 1847: Pankreas, § 7, s. 669.....Cruveilhier, loc. cit.

[7] Clark, loc. cit., Recklinghausen, op. cit. 16.

II. SYMPTOMATOLOGY.

In endeavouring to inform ourselves with regard to the symptomatology of calculous disease of the pancreas, the same difficulties are encountered as beset our studies of its pathological anatomy. The older writers are as obscure in their description, and brief in their enumeration of symptoms, as they are obscure and brief when pathological conditions were to be described or enumerated. And more, in modern times, instances of calculous disease of this gland are rather regarded as curiosities to be alluded to by a pathological anatomist, than as subjects worthy the study of a clinician. And considering, as we must, the great number and variety of those diseases with which the active practitioner daily comes in contact, and which still remain so intractable to all therapeutic resource, we can well understand how a condition, relatively so rare as calculous disease of the pancreas, a condition about which we can learn so little from literature, either past or contemporary, whose history and causation are so obscure, whose diagnosis is so difficult, and whose treatment is so ineffectual, should fail to receive more than superficial study, or passing mention. Therefore, when, as here, we leave aside the study of the lesion, its causation, and its treatment, and confine ourselves solely to those signs and symptoms which would lead us to infer its presence, we cannot hope to find anything so characteristic as is revealed by the physical exploration of the chest, or the temperature curve of a fever.

The pancreas, it is true, plays a most important part in the great act of digestion, but when, by disease, its functions are perverted or destroyed, so intimate are both its structure and functional connection with the other members of the same great system, and so great may be its pathological alterations, without there being any tangible evidence of the same, that from the start our diagnosis becomes most difficult. But even should disease be located in the pancreas, it would be almost, if not completely impossible, to differentiate, for example, between cancerous and calculous disease of that organ. It will be our endeavour, in the following pages, to make, from a study of the cases at our command, a complete, but we fear an unsatisfactory recapitulation of the various views advanced from time to time upon the symptomatology of this disease, and to give due weight to such as seem to us of the greatest clinical importance, both in pure, uncomplicated cases of pancreatic calculi, and in those accompanied by disease of other organs and tissues.

It is most important, while endeavouring to explain the symptoms of calculous disease of the pancreatic ducts from a pathological standpoint, to remember two things, already briefly referred to, namely, the anatomical position and local relations of the pancreas, and its physiological function as a most important digestive organ. Deep-seated and surrounded as it is by structures whose organic and functional integrity is of such importance to the well-being of the economy, it is easy to see how, for

example, from mere enlargement, by mechanical pressure, it could cause changes and disturbances the most grave. In one case, a pancreas, three times its normal size, and filled with concretions, so pressed upon the aorta as to produce an enormous aneurismal dilatation of that vessel above the point of obstruction.[1] In another, the return flow of blood through the inferior cava was interfered with to such an extent as to cause ascites with œdema of both legs.[2]

In a third, where the spleen was found much softened and disintegrated, in default of a more suitable explanation, the lesion is attributed to compression of the splenic artery and veins by the enlarged, earthy, and indurated pancreas;[3] while, from pressure upon the excretory ducts of the liver, we find jaundice from retention, a condition by no means uncommon.[4] When we consider, finally, the local relation between the pancreas and the cœliac plexus of nerves, we find ourselves entering upon a branch of our subject the most interesting.

In a large number of the reported cases of pancreatic calculi, *pain* is mentioned as one of the most constant, and, at the same time, one of the most annoying of symptoms. But it is not one kind of pain only that we find described, but rather two, differing essentially in character one from the other, and having, in most cases, two entirely distinct modes of causation. The one dull, heavy, a sense of weight, a sense of uneasiness, located in the epigastrium, lasting, in some cases, throughout the entire attack,[5] while, in others, it preceded the actual illness of the patient by many years.[6] The other, sharp, severe, sudden in its onset, irregular in its accession, spontaneously relieved, yet reoccurring when least expected.[7] Separately or together these two kinds of pain, in different degrees of severity, occur very often in cases of calculous disease, and, in seeking for their mode of causation, two conditions are, we think, necessary to afford a satisfactory explanation. The various sensations at first referred to, varying in degree from a feeling of uneasiness or of weight, to pain, generally constant, and, in some instances, quite severe, are due, it would appear, to the pressure of a hard and enlarged pancreas upon the cœliac plexus of nerves. Although it would seem, at first sight, as if the mere presence of calculi within the pancreas would be quite suffi-

[1] Salmade, loc. cit.....Portal, loc. cit.....Dufrèsne, loc. cit.

[2] Dufrèsne, quoting Portal's second case, see Maladie du foie, obs. f, p. 300..... Clark, loc. cit.....Muhlbauer, loc. cit., noticed œdema of extremities of left side only.

[3] Wilson, loc. cit.

[4] Meckel, loc. cit.....Fournier, loc. cit.....Dufrèsne, ibid.....Gould, op. cit. § 576. .....Henry, loc. cit.....Friedreich, op. cit. p. 618.....Galiati, loc. cit.

[5] Mercklin, loc. cit.....Wilson, loc. cit.....Clayton, loc. cit.....Muhlbauer, loc. cit.....Fournier, loc. cit.....Henry, loc. cit.....Gould, op. cit. § 576.....Elliotson, Med.-Chirurg. Trans., loc. cit.

[6] Mercklin, ibid.....Gould, ibid.....Henry, ibid.....Galiati, ibid.....Pepper, Medical Ward Notes, Hospital of the Univ. of Pa., 1880.

[7] Schupmann, loc. cit.....Wilson, loc. cit.....Gould, loc. cit.....Clayton, loc. cit. .....Dufrèsne, loc. cit.....Clark, loc. cit.....,Fournier, loc. cit.....Pepper, loc. cit.

cient to account for these subjective symptoms, yet, as it has been remarked, the relative insensibility of the excretory ducts of this gland, as compared with those of the liver or kidney, renders it improbable that much inconvenience or pain would be caused, even though they were distended by calculous concretions.[1] Whereas, if the cœliac plexus could be so compressed (under circumstances such as we have above described) as to suffer atrophy, and even complete destruction of its ganglionic cells,[2] it seems very probable that this, or even a far less degree of pressure, would produce pain. Our explanation is further borne out by the fact, that, when the recumbent posture is assumed, the pain grows worse,[3] while occasionally it radiates to the back, chest, and even right shoulder.[4] We are, therefore, led to conclude that this symptom, pain, is the result of pressure, and may, as has been suggested, be called a cœliac neuralgia.[5]

But when we come to consider the other kind of pain described, another and more suitable explanation offers itself. This, the true pancreatic colic, the result of the rapid distension of the duct of the gland by a stone forcing its way into the duodenum, the walls of the duct spasmodically contracting upon it, has been referred to in a former section. From a diagnostic point of view this symptom has but little weight, for it is difficult to tell, from the character or location of the pain, whether a biliary or a pancreatic calculus is being passed; as a pancreatic calculus, in its passage through the last part of the duct of Wirsung, by pressure on the common duct, would produce jaundice as effectually as would one of biliary origin.[6]

Before leaving this part of our subject, it is well to refer briefly to the existence of *mellituria*, as a symptom of calculous disease of the pancreas, since it occurs with sufficient frequency to demand attention.[7] In so much obscurity is the morbid anatomy of diabetes mellitus involved, that it would be alike useless and impossible, within the limits of this paper, to go at length into the theories that have been advanced as to its causation. Suffice it to say that, whereas, in each and every organ of the body, the morbid change, of which the con dition known as mellituria is the result, has been from time to time located, it seems highly improper that the pancreas, as one of the organs of importance, should not bear its part of the burden. In one of two[8] cases of calculous disease (where, during life, mellituria was present), in which a careful examination of the cœliac plexus of nerves was made after death, changes consist-

[1] Gross, loc. cit.....Bigsby, loc. cit. [2] Klebs, op. cit. s. 544.

[3] Wilson, loc. cit.....Gould, op. cit. § 576.

[4] Elliotson, Med. Ch. Trans., loc. cit.....Fournier, loc. cit.....Pepper, Med. Ward Notes, Univ. Hosp., loc. cit.

[5] Klebs, op. cit. s. 544. [6] Friedreich, op. cit. p. 618.

[7] Recklinghausen, op. cit. I. a. and b.....Elliotson, Med. Chirurg. Trans., loc. cit..... Cawley, loc. cit.....Klebs, op. cit. s. 544.....Chopart, Maladies des voies urinaires. .....Cf. Klebs, loc. cit.....Pepper, Med. Ward Notes, Univ. Hosp., loc. cit.

[8] Klebs, op. cit. s. 544.....Recklinghausen, loc. cit.

ing in the destruction of a certain number of its ganglionic cells could be observed. Now, since it is affirmed that extirpation or atrophy of the cœliac plexus will give rise to the presence of sugar in the urine,[1] it is plain how secondary changes in this plexus of nerves of sufficient gravity to bring about this condition, could be produced by the pressure of a pancreas, made large and hard by the presence of calculi. And, to go further, atrophy of the pancreas will follow these changes in the cœliac plexus as atrophy of the submaxillary gland will follow section of the vaso-motor nerves supplying it. The appearance of fatty stools after mellituria would seem to prove this.[2] There is no doubt at least that atrophy of the cœliac plexus will produce a vaso-motor paralysis throughout the whole area occupied by the pancreas, for all the vessels have been seen enormously dilated, and the spleen engorged and swollen.[3]

In regard to those symptoms which are the result of an improper performance of the physiological functions of the gland, due to the presence of calculi within it, we can only enumerate, without endeavouring to explain, the phenomena mentioned in the reported cases. When the main excretory duct of the pancreas was entirely blocked up by concretions, the symptoms of digestive derangement were of course more marked than when the outflow of the pancreatic juice was in whole, or in part, permitted. In thirteen cases, we find the actual illness of the patient preceded for a variable length of time, and ushered in by more or less marked symptoms of gastro-intestinal derangement, accompanied in some cases by abdominal pain. During the progress of the disease, these symptoms become more persistent, and increased in severity, so that, in many cases, the termination of the organic disease in complete duct obstruction placed a limit to the patient's life, while, as has been remarked, we find changes in other parts of the body capable of spoiling life, but not of causing death.

In four cases, where, upon post-mortem examination, calculi were found in the pancreas, *vomiting* was one of the most distressing symptoms present during life.[4] In three others, bloody vomiting was noticed.[5] In six cases, *diarrhœa* was present;[6] in four, melæna;[7] while *constipation* was observed in six,[8] and fatty stools in three.[9]

The presence of fat in the stools is a symptom of great importance in the recognition of pancreatic disease,[10] but that it is not of absolute diag-

[1] Klebs, op. cit. s. 544.
[2] Fles, cf. Klebs, op. cit. s. 544.
[3] Klebs, loc. cit.
[4] Cases reported by De Graaf, Mercklin, Galiati, and Schupmann.
[5] Wilson, Gould, Clayton.
[6] DeGraaf, Gould, Dufrêsne, Henry, McCready, Janeway.
[7] DeGraaf, Elliotson, Gould (two cases).
[8] Galiati, Cawley, Schupmann, Wilson, Clark, Wm. Pepper.
[9] Elliotson, Gould, Clark.
[10] This subject will be found discussed at length in the Medico-Chirurgical Trans., London, 1832, vol. xviii. p. 76, and elsewhere in the same volume by Lloyd & Bright.

nostic value is proven by the well-known fact, that the same condition will follow upon the obstruction of the biliary passages. For, while the main action of the pancreatic juice upon fats is to cause their emulsification, this power is possessed, though to a less extent, by the bile, which, like the succus entericus, emulsifies fat, but does so to a degree entirely insufficient to meet the needs of the economy. Therefore, it must be remembered that not the bile alone, nor the pancreatic juice alone, can properly digest fats, but rather that they must act together, mutually aiding one another in the performance of this joint function. But since, as an emulsifying agent, the pancreatic juice is far more active than the bile, it might be argued that fatty stools would be more symptomatic of pancreatic than of hepatic disease. But, even should jaundice and fatty stools *both* be present in the same case, it by no means follows that they together point to biliary obstruction, for, as has been shown, a pancreatic calculus, lodged in the duct of Wirsung just as it enters the duodenum, may, by pressure on the common duct, prevent the escape of bile, and give rise to jaundice, while, at the same time, by this obstruction, but more by preventing the outflow of the pancreatic juice, cause the appearance of fat in the excreta. In proof of the first of these assertions, it may be said that in two instances of calculous disease in which the excreta presented a pale or clay-coloured appearance, upon post-mortem examination, no morbid alteration of sufficient gravity to cause this condition was found in the liver, and the dilated ducts contained no obstruction, the common duct opening freely into the duodenum, while the pancreatic duct was impervious, being blocked up with calculi.[1]

It is strange that the presence of fat is noted in so few cases of this pancreatic disease, and, since the condition is one of some rarity, we will append an abstract of the three cases in which it was observed.

CASE I.[2] H. M., æt. 57; derangement of digestion for some years; fat noticed in urine, one month later also in excreta. In a short time fat oozed away from lower bowel without intermission or volition. Pain, progressive emaciation, and death from exhaustion. *Autopsy:* Liver congested, ducts dilated but healthy. Pancreatic duct at duodenal end completely blocked up by a mass of calculous matter.

CASE II.[3] W. P., æt. 45, had pain, diarrhœa, melæna; blood disappeared from, and fat appeared in stools and urine; amount of fat and severity of pain diminished as death approached; sugar appeared in urine; exhaustion, death. *Autopsy:* Liver, gall-bladder, and bile-ducts sound. Pancreatic duct and its larger branches crammed with calculi.

CASE III.[4] Man, æt. 40, had several attacks of hemorrhage from bowels; diarrhœa and constipation alternated; tenderness in epigastrium, pain; fat in stools (apparently only after articles containing fat had been eaten); no fat in urine; jaundice; death in coma. *Autopsy:* Liver rather small and dark-coloured; ducts dilated, contained no obstruction, free opening into common duct. Pancreatic duct obliterated at duodenal end.

[1] Gould, op. cit. § 576..... Clark, loc. cit.
[2] Clark. [3] Elliotson, Med.-Chir. Trans., loc. cit. [4] Gould, § 576.

There have been discussed up to this point the symptoms which may be considered most characteristic of calculous disease of the pancreas, but there are certain others mentioned which it may be well to refer to. The appetite, "inordinate,"[1] "craving,"[2] "ravenous,"[3] especially in those cases where large quantities of fat passed away undigested, has been said to be impaired, tending in some cases toward complete anorexia.[4] As a natural result of the crippled condition of the nutritive processes, progressive emaciation,[5] accompanied by debility,[6] and followed by extreme prostration and exhaustion, would be expected.[7] Nothing worthy of comment is to be noticed with regard to the circulatory, respiratory, or nervous systems; whatever derangement we find mentioned can all be explained by the presence of other lesions, complicating the pancreatic disease. A most interesting condition is met with when we come to consider changes present in the urine. It will be seen, in the three cases already recorded, in which fat was found in the stools, that in two, fat passed away with the urinary secretion, and indeed, in one, made its appearance one month before it was detected in the excreta, and in such quantity as to float, when cool, in greasy cakes upon the surface.[8] Lastly, a peculiar colour of the skin, which is believed by some to be pathognomonic of pancreatic disease, must be mentioned, in connection with three cases of calculous affection in which it was observed. In them the appearance presented is variously described as being unhealthy, pale-yellow, dirty or earthy, and seems, except in one case, in which it was confined to the face, to have been general.

The ordinary methods of physical examination offer some partial assistance in the recognition of calculous disease of the pancreas. By palpation it is most difficult to recognize the position of this organ in health. "By deeply depressing the abdominal walls about a hand's-breadth below the umbilicus, by then rolling the subjacent parts under the hand (the stomach and colon must be empty), it might be possible to detect it in an individual who is thin and whose tissues are lax."[9] In a case where the size of the pancreas is only slightly increased by the presence of calculi, on careful palpation, it might be possible to detect a feeling of resistance, although when the gland is markedly enlarged, as in one of the reported cases of this affection (by an enormous stone formation situated in its tail, and the presence of a scirrhus at its head), a tumour of cartilaginous hardness might be perceived after careful examination of the abdomen. In the case referred to, the tumour was flat, slightly movable, and sensitive to the touch.[10] This is the only instance of this affection in which a

[1] Clark. [2] Gould. [3] Wm. Pepper.
[4] Schupmann.....Fournier. [5] Clayton, Clark, Wm. Pepper.
[6] De Graaf, Dufrêsne, Clark. [7] Fournier.
[8] Clark, Wilson, Henry, Janeway.
[9] Sir Wm. Jenner, British Med. Journal, Jan. 16, 1869, p. 42. [10] Schupmann.

local examination was made, except in three instances where a large cyst was the result of duct obstruction,[1] and in a fourth, where an enormous abscess, situated in the head of the gland and filled with calculi, caused the appearance of a localized epigastric swelling.[2] The diagnosis of abdominal tumours, as is well known, is extremely difficult, and is not a subject which it is our intention to discuss. To distinguish such a condition as we first described from a scirrhus involving the pyloric end of the stomach, or an induration of the left lobe of the liver, would, by physical exploration alone, be most difficult; while the characteristic thrill and bruit of an aneurism might be simulated by the rush of blood through an abdominal aorta compressed by an enlarged pancreas.[3] And so it is with cysts of this viscus, which can only be recognized by their situation, deep in the region of the pancreas, their round or oval shape, smooth surface, and the sense of fluctuation imparted to the touch,[4] while in both these conditions the general symptoms, which have been mentioned as more or less characteristic of calculous disease, would be of aid in determining upon a diagnosis.

III. DURATION AND TERMINATION.

No decided laws can be laid down with regard to the duration and termination of this affection. So rare is it to find a pure uncomplicated case of calculous disease, that any generalization would be impossible; nevertheless, taking all those cases in which both clinical history and post-mortem examination are recorded, we find death from exhaustion or asthenia one of the most frequent of all terminations. In four cases, diabetes was the cause of death;[5] in one, rupture of an aneurism produced by the disease itself;[6] in another, internal hemorrhage, consequent upon a laceration of the pancreas, the calculus escaping into the peritoneal cavity.[7] Pneumonia is referred to in one case as hastening the fatal issue,[8] while aortic disease,[9] an accident of pregnancy,[10] and albuminuria and phlebitis[11] are each mentioned as having placed a limit to life.

BIBLIOGRAPHY.—*De Graaf*, Tractat. anat. med. de succi pancreat., Lugd. Batav., 1671, cap. vii. p. 112. *Mercklin*, Ephem. nat. cur. decur., Frankfort and Leipsig, 1678, Ann. 8, obs. 50, p. 78. *Eller*, Collection Académique, Paris, 1755, tome x. p. 85. *Meckel*, Koreff, Dissert. inaug. med. sistens theoret. consid. Icteri, Halæ magd., 1759, § 12, p. 16. *Störck*, Ann. med. Vindobon, 1760, t. ii. p. 245. *Matani*, Naturen geneeskundige Bibliotheek, gravenhage, 1765: and Gottingische anzeigen von Gelehrten sachen, 1765, No. 10. *Lieutaud*, Hist. anat. méd., Paris, 1767, liber 1, sect. viii. obs. 1045, p. 244. *Fournier*, Journ. de méd. chirurg. pharm., Paris, 1776, tome xlv. p. 149.

[1] Gould, § 576.....Dufrêsne, quoting Portal's 2d case. [2] Fournier.

[3] The diagnosis in such a case might be assisted, as suggested by Prof. Wm. Pepper, by placing the individual in the genu-pectoral position, and then using the method of palpation.

[4] Friedreich, Cysts, op. cit. p. 615.

[5] Cawley, Elliotson, Recklinghausen. [6] Salmade. [7] Clayton.

[8] Janeway. [9] Curnow. [10] Schmitt. [11] McCready.

Sandifort, Obs. anat. patholog., Lugd. Batav., 1777, lib. iii. cap. iv. p. 73. *Cawley*, London Medical Journal, London, 1788, vol. ix. part iv. p. 286. *Salmade*, Recueil périodique de la soc. de méd. de Paris, 1797–1798, tome iii. p. 454. *Portal*, Cours d'anat. méd., Paris, 1803, tome v. p. 356. *Schmitt*, Zweifelhafte Schwanger, Wien, 1818. *Muhlbauer*, Neue Notizen (von Froriep), Weimer, 1822–1847. *Duponchel*, Soc. méd. d'Émulat., 1824, t. ix. p. 76. *Gendrin*, Histoire anat. des inflam., Paris, 1826, tome ii. p. 263. *Lecannan*, Journ. de pharm. et de chim., Décembre, 1827, p. 626. *Pemberton*, On Various Diseases of the Abdominal Viscera, Richmond, Va., 1830, chap. iv. p. 64. *Bécourt*, Recherches sur le Pancréas, Thèse, Strasbourg, 1830, § 5, p. 69. *Baillie*, The Morbid Anatomy of the Human Body, London, 1812, p. 115, and 1833, p. 222. *Bigsby*, Edinburgh Medical Journal, 1835, vol. xliv. p. 97. *Mondière*, Archiv. gén. de méd., II série, Paris, 1836, t. xii. p. 147. *Schupmann*, Hufeland's Journal, 1841, xcii. Bd. § iii. s. 41. *Engel*, Oesterreich med. Jahrbücher, 1841, xxiii. u. xxiv. Bd. *Wilson*, Med. Chirurg. Trans., London, 1842, vol. xxv. p. 42. *Devilliers*, Revue médicale, no. de Décembre, Paris, 1844, t. iii. p. 576. *Gross*, Pathological Anatomy, Phila., 1845, p. 689. *Gould*, Catalogue of the Anatomical Museum of Boston Society for Medical Improvement, Boston, 1847, §§ 575, 576, p. 173. *Schulze*, Journal für der Chemie, xxxix. p. 29. *Rokitansky*, Manual of Pathological Anatomy, Syd. Soc. London, 1849, vol. ii. § 2, p. 180; and Lehrbuch der Pathol. Anat., 1861, iii. s. 313, 369. *Clayton*, The Medical Times, London, 1849, vol. xx. p. 37. *Clark*, London Lancet, Aug. 15, 1851. *Dufrêsne*, Traité de l'affection calculeuse du foie et du pancréas, Paris, 1851, Article deuxième, p. 494. *Virchow*, Verhand. der med. physik. Gesellschaft zu Würzburg, 1852, II. Bd. s. 53 u. III. Bd. s. 368. *Virchow*, Die krankhaften Geschwülste, Berlin, 1863, I. Bd. s. 276. *Jones & Sieveking*, A Manual of Pathological Anatomy, Phila., 1854, p. 532. *Henry*, Journ. de chim. méd., IV. série, Paris, 1855, t. i. p. 273, et La France méd. et pharm., 3 année, Paris, 1856, No. vi. p. 42. *Jones*, Med.-Chirurg. Trans., London, 1855, p. 195. *Cruveilhier*, Traité d'anat. pathol. gén., Paris, 1856, t. iii. p. 365. *Ancelet*, Essai analytique sur l'anatomie pathologique du pancréas, Thèse, Paris, 1856, t. i. p. 26. *McCready*, New York Medical Journal, 1856, p. 78. *Hoppe*, Virchow's Archiv, 1857, xi. Bd. s. 96. *Parsons*, British Medical Journal, June 6, 1857, p. 475. *Recklinghausen*, Virchow's Archiv, Berlin, 1864, 30 Bd. s. 360. *Ancelet*, Études sur les maladies du pancreas, Paris, 1864. *Maier*, Archiv der Heilkunde, Leipsig, 1865, s. 168. *Jenner*, British Medical Journal, Jan. 16, 1869, p. 42. *Cornil et Ranvier*, D'Histologie pathologique, Paris, 1869–1873, tome ii. p. 974. *Pepper*, Centralblatt für die med. Wissensch., 1871, p. 156. *Delafield*, Handbook of Post-mortem Examinations and of Morbid Anatomy, New York, 1872, p. 203. *Janeway*, New York Medical Record, 1872, vol. vii. p. 357. *Curnow*, Trans. Pathol. Soc., London, 1873, vol. xxiv. p. 136. *Zenker*, Tagblatt der 47. Versam. deutsch. Natur. u. Aerzte in Breslau, 1874, s. 211. *Schmidt*, Annäl de. Chem. u. Pharm., 1854, xcii. p. 33. *Wilkes & Moxon*, Lectures on Pathological Anatomy, Phila., 1875, p. 470. *Flint*, Text-book of Human Physiology, New York, 1876, p. 272. *Klebs*, Handbuch der Patholog. Anat., Berlin, 1876, I. Bd. s. 544 u. 547. *Carpenter*, Physiology, Phila., 1876. *Friedreich*, Ziemssen's Cyclopedia of Medicine, New York, 1878, vol. viii. pp. 615–618. *Cornil and Ranvier*, Manual of Pathological Histology, Translation, Phila., 1880, p. 581. *Foster*, Text-book of Physiology, American edition, Phila., 1880, p. 333. *Wm. Pepper*, Medical Ward Notes, 1880, Hospital of the University of Pennsylvania.

Omissions. *Galiati*, De morbus duobus observ., 1758, p. 26, or Comment. Bonon., t. iv. p. 34. *Rugg*, London Lancet, May 18, 1850. *Boch*, Lehrbuch der Pathol. Anat., Leipsig, 1847, § 7, s. 669.

ARTICLE VI.

CLASSIFICATION OF THE "PORRO (?) OPERATIONS." WHAT IS A TRUE PORRO-CÆSAREAN OPERATION, AND WHAT OTHER FORMS OF UTERINE ABLATION IN PREGNANT WOMEN HAVE BEEN ERRONEOUSLY CALLED "PORRO," AND SHOULD BE SEPARATELY CLASSIFIED. By ROBERT P. HARRIS, A.M., M.D., of Philadelphia.

SEVEN years have passed since Prof. Porro, then of Pavia, and now of Milan, instituted the modification of the old Cæsarean operation which bears his name, designing thereby, if possible, to diminish the great mortality of the mothers whose deformed or obstructed pelves required that they should be delivered by abdominal incision, and especially in the large maternity hospitals of Europe, in which but very few of the subjects escaped death. In fact, so great was the maternal mortality that, in some of the large cities, as Paris and Vienna, a fatal result was universal. The *classic* method, as it has been called under a misconception of its age, was intended to save two lives wherever possible, and to avoid the destruction of the fœtus. By this old operation, whose age cannot be established beyond four centuries back from any reliable evidence, the child was readily saved, where it was performed in due season, but, as this was rarely done, a large proportion perished, from having been too long subjected to uterine pressure.

The title given by Prof. Porro to his method, viz., "*Utero-ovarian amputation as completive of the Cæsarean operation*," conveys an idea of its true character. The old operation is to be first performed, the fœtus removed, and the uterus made to contract; then the plan is radically changed; the uterus is drawn through the abdominal wound; its neck is ligated by a wire constrictor tightened by screw-power; the organ is cut away above the loop, and the stump is secured in the lower angle of the abdominal wound. The design of this change is to avoid the possibility of the escape of *post-partum* uterine fluids into the abdominal cavity, and the dangers consequent thereupon, by converting the uterine wound, with its disposition to gape open, into an open stump, external to the body, and discharging externally under antiseptic dressings. This method also possesses the additional advantage, that it may be performed prior to labour, thus avoiding the exhaustion consequent upon this painful effort of nature. Many operations have been performed before the maturity of gestation, and many after labour had progressed for a short or long period. And it is very evident that, as in the old operation, the result will depend very much upon *the condition of the woman at the time of its performance;* if such as to make the prognosis favourable, a large proportion will recover.

Although Prof. Porro is entitled to the credit of having performed the first successful puerperal utero-ovarian amputation, and I think also of

having the method bear his name, we are to remember that an unsuccessful operation of a very similar nature was performed in this country in 1869, by Prof. Storer, then of Boston, now of Newport, R. I. As the latter failed in saving the life of the mother, there was no repetition of his method in the seven years which elapsed between his case and that of Prof. Porro. Had he succeeded, under the circumstances of extremity, which compelled him to clamp and remove the uterus, it is not likely that he would have had imitators in the sense that Porro has had, after an elective operation, based upon a theory, obtained from the success of experiments tried upon the lower animals, and again tried on the human female with a similar result, the case being one of ordinary rachitic obstruction of the pelvis.

1. *Müller's Modification.*—In the first eight Porro-Cæsarean operations, covering a period of twenty months, the original plan was adhered to, with a loss of six women, all of the children having been saved but one. A woman then came under the care of Prof. Müller, of Bern, whose condition was such as to induce him to modify the method of Porro, hoping thereby to escape the dangers of hemorrhage, and the risks from having blood and noxious fluids pass into the abdominal cavity during the operation. This patient was the subject of malacosteon; had been 3½ days in labour; was in a febrile condition, and presented indications of septic endo-metritis, with gas in the uterine cavity as an evidence of decomposition of the fœtus. To secure her against the dangers mentioned, Prof. Müller made a long incision in the abdomen, drew out the uterus, carefully protected the abdominal cavity against the entrance of fluid, put on the wire constrictor and secured it, opened the uterus and removed its putrid contents, and, finally, secured the stump as in the original Porro operation. The patient recovered. The success of Müller, and a belief in the value of his method, caused many to imitate him, and although unsuccessful for a time, such has been the general result that it has now a number of advocates. It has not met with much favour in Italy, but has been repeatedly preferred in Austria and Germany. The chief objections to the method, are the long incision and the danger of losing the fœtus from asphyxia. This risk of loss is more apparent than real, if the uterus is rapidly evacuated after its constriction; but in a recent case under Prof. Carl Braun, of Vienna, the fœtus could not be resuscitated, owing to a little delay at this point of the operation. Having seen two narrow escapes under the method, I believe this to be one of the dangers to be especially guarded against.

2. The "*Esmarch bloodless operation*" has been used in combination with the two preceding methods. It was first tested by Prof. Litzmann, of Kiel, a colleague of Esmarch, on June 14, 1878, and proved fatal from septic peritonitis on the sixth day, not from any defect in the process, but from an unfortunate occlusion of the os uteri, which prevented the escape

of fetid pus that collected after the operation in the cervical canal. This combination of the Porro, Müller, and Esmarch methods has recently been revived with success in three consecutive cases by Prof. Carl Braun, of Vienna. After the uterus is turned out, the elastic tube is made to surround the cervix tightly, before the incision is made, so that there shall be no loss of blood beyond what already exists in the vessels of the organ. This has been found of special advantage in cases where the placenta is located under the line of incision. In addition to the elastic tubing, the constricting wire is to be passed around the cervix and held in readiness for tightening, when the former is to be removed. If the Esmarch tubing is not hurriedly applied, and the fœtus quickly liberated, it will be lost.

3. *Ligating and Dropping in the Stump.*—Under the impression that the cut cervix should and could be treated as a pedicle, several operators have boldly tied it and dropped it in. It was first tried by Prof. Gustav Veit, of Bonn (March 21, 1880), but with a fatal result. Wasseige amputated the cervix by double flap and stitched the two halves together after the process of Schroeder, but lost his patient. Prof. Gustav Braun pocketed and stitched up the stump in two instances, but both patients died. Prof. Isaac E. Taylor, of New York, saved his case so far as the danger from the dropped cervix was concerned, but lost her in twenty-six days, from her own perversity in sitting up when he had warned her against the danger.[1] The fact that Prof. Veit, in a second operation (Sept. 18, 1880), and Dr. Kabierski, of Breslau (Jan. 15, 1883), did succeed in saving each a patient in whom they dropped in the stump, only shows that the method is not necessarily fatal; but this need not encourage others to imitate them. It is much to be regretted that this method is so dangerous, as otherwise it would have several advantages over the original Porro plan, which often makes an ugly drawn cicatrix, and interferes more or less with the dilatation of the bladder.

4. *Non-Cæsarean Utero-abdominal Amputations.*—When a uterus containing a fœtus of four, five, or six months is removed, with perhaps a large fibro-myoma, or mass of fibroid tumours, without the viscus being opened at any stage of the operation, what propriety is there in denominating the ablation a Porro operation? Prof. Wasseige, on March 18, 1880, operated upon a woman nearly five months pregnant, who was affected with a large cystic fibro-myoma. He did not open the uterus, neither did he secure the stump as recommended by Porro. It was not a Cæsarean section at all, and yet it, and several others quite similar to it, have been placed in the list of Porro-Cæsarean operations. The fœtus not being viable in these cases, there was no Cæsarean delivery as a first stage; and the second might with as much propriety be named after Schroeder or Péan, according to the method used, as after Porro, whose process is

[1] She had at the time a double phlegmasia dolens, and died of cardiac thrombosis.

simply a mode of concluding the old Cæsarean section. Several of such cases it is true have recovered, but this does not alter the position I now take, in claiming that they should be placed in a different classification from those of the true Porro type.

5. A still different manner of operating was pursued by Dr. Leon Oppenheimer, of Wurzburg, on July 4, 1880. The patient was 43 years of age, the subject of malacosteon, and pregnant for the fourteenth time. Intending to perform an ordinary Müller operation, he turned out the uterus by a long incision, but finding its walls as he thought dangerously thinned, feared to make pressure upon the cervix; he therefore performed an extra-abdominal hysterotomy, delivered the fœtus, left the placenta *in situ*, kneaded down the uterus, and when it was well contracted, applied the clamp of Mr. Spencer Wells, cut away the viscus, and cauterized the stump with a thermo-cautery. This operation took place in a private house, before labour commenced, and both mother and child were saved.

This case reminds me of an operation which was performed in this city on March 5, 1883, at the Woman's Hospital, by Dr. Anna E. Broomall, assisted by Dr. Albert H. Smith, the consulting accoucheur. Desiring to avoid hemorrhage, Dr. Broomall turned out the entire uterus; Dr. Smith then grasped the cervix so as to control its circulation, whilst she opened the organ and delivered the fœtus, he retaining his hold until the uterus was well contracted, when it was returned into the abdominal cavity, its wound sutured, and that of the abdomen closed and dressed. Very little blood was lost during the operation, which was not an original one, except in the substitution of the hand for the elastic tube of Esmarch. The patient of Dr. Broomall, having been exhausted by a labour of thirty-six hours, died of septic peritonitis in thirty-six hours, a frequent sequel of wounding a uterus after it has been long under the effect of muscular action. The cause of difficulty was a pelvic deformity, the conjugate diameter of the superior strait measuring two and seven-tenths inches.

6. Strange as it will appear, after a careful examination of the subject, statistical collectors still insist in calling a hysterectomy performed after a laparotomy following a rupture of the uterus a "Porro operation." As there is no Cæsarean section here, there is certainly no propriety in the title given. The method originated with Dr. Oscar Prévôt, of Moscow, who first performed it, and is entitled to have it called after him, although there is as yet little honour to be gained from it, as the six cases thus treated have died. Far better results have been obtained in the United States, by either leaving the uterus intact, after removing the fœtus and cleansing the abdominal cavity, or by taking the additional precaution to stitch up the uterine rent.

By a careful examination of the several forms of uterine ablation called by the name of "*Porro*," we will find the following in order:—

1. The true Porro-Cæsarean Section, with the stump of the cervix secured in the abdominal wound, as directed by its originator.
2. The Porro-Müller Cæsarean Section, with the stump as above.
3. The Porro-Müller Cæsarean Section, the uterus being opened with Paquelin's thermo-cautery knife (Chiara of Milan).
4. The Porro-Müller Cæsarean Section, the constriction being made after the plan of Esmarch, and the stump secured as above.
5. The Porro-Cæsarean Section, with the stump ligated, and dropped into the abdominal cavity.
6. The Müller Incision; uterus unopened before ablation; cervix incised and stitched up after the manner of Schroeder, and dropped in.
7. The Porro-Cæsarean Section, constriction with Esmarch tubing, and stump dropped in.
8. The Müller Ablation; uterus not opened; stump secured in the abdominal wound.
9. Utero-ovarian amputation after laparotomy for rupture of the uterus (Prévôt of Moscow).

Thus, we have no less than nine forms of operation, some of them differing very materially from the original, all called by the name of "Porro," and classified together, although having very different rates of mortality. It is hardly necessary to claim that this is very unjust to the originator, and unfair to his operation. If the Porro method is to stand upon its merits, rated by its proportion of cures, we must in justice exclude from the record all the cases not strictly deserving of the title. As it would only complicate matters to make nine orders of cases, I propose to combine them where this can be fairly done, and thus reduce the list to four.

1. Nos. 1, 2, 3, and 4 may be classified as *Porro cases*, care being taken to designate those in which the uterus was turned out of the abdomen before incising it as "Muller sections."

2. Nos. 5 and 7 will form a *second class*, the distinction being that the stump of the cervix was not secured as designed by Prof. Porro, but dropped in, thereby adding very materially to the mortality of the mothers.

3. Nos. 6 and 8 represent a *third class*, including all the non-Cæsarean ablations of the puerperal uterus, in which the fœtus has not yet reached a viable age.

4. No. 9 constitutes a class by itself. For simplicity we will name the four classes, viz.,

1. { True Porro operations. / Porro-Müller operations.
2. Puerperal utero-ovarian amputations, with the pedicle dropped in.
3. Premature ablations of the gravid uterus, the fœtus not being viable.
4. Prévôt's operation, miscalled "Porro."

It is just to Professors Porro and Müller to keep their respective methods separate, in rating the mortality of mothers and children, although, where either plan has been adopted in a hospital in a series of cases, there would appear to have been a nearly similar result; as, for example, in the Porro operations of Santa Caterina, Milan, and the Porro-Müller operations of the Allgemeine Krankenhaus, Vienna. It has been stated recently that the Porro operation is falling off in respect to its proportion of mothers saved, when the fact is, that just the contrary is known to be true, by those who write from knowledge, and not from conjecture, based upon the few reports that appear in our leading journals. The reports that have come to me of operations thus far performed in this current year (14), show a recovery of 9, or more than 64 per cent. for all countries. Prof. Porro is now in a position where the prevalence of deformities of the pelvis will enable him to personally test his method in a few years. He has adhered very closely to his original design in operating, as have also his predecessors on the staff of Santa Caterina, except in the instance where Prof. Chiara used the long incision. Thus far, this hospital has saved 9 women out of 12, and all of the children. Thus far, also, Prof. Porro has saved, of his own cases, 4 out of 5.

As an effort is now being made by three several parties in Europe to collect, respectively, first, the Italian operations; second, the first hundred Porro, and Porro-Müller operations; and third, all the so-called "Porro" cases properly classified; we shall in time be able to state authoritatively what has thus far been done by the advocates of the Italian method. These three papers are in the hands of parties who have successfully performed the Porro operation; and the last will, no doubt, from the pains and trouble taken by its author, give us a more reliable and accurate tabular record of all the cases, than any monograph we have yet examined. Being fully conversant with the errors of his predecessors, it will be the aim of the author to avoid them. Personal experience in this kind of work leads me to commend the zeal of him who is willing to do the drudgery which, to be accurate, will be required of him. Of all the different orders of operations that have been styled "Porro," I have a tabular record of 127, of which 14 have been performed since Jan. 1, 1883.[1] It would look like a simple matter to ascertain the accuracy of the reports on which this table is based, and to fill up the points omitted by their authors. I did this once, with a much shorter record, and am very willing now to let another take up the work where I left off, and get the credit which is justly due him.

[1] Since this paper was in type, I have received the voluminous and carefully prepared record of Dr. Clement Godson, of London, which gives of my first and second classes combined, 129 cases and 71 deaths; of the third class, 5 cases with 2 deaths; and of the fourth, 6 cases with no recovery. The dropped pedicle cases are 13 of the 129, and 11 were fatal. Exclude them, and we have 116 operations of my first class with 56 recoveries. The whole record of Dr. Godson, 116 + 13 + 5 + 6, is 140 cases, with 61 women and 102 children saved.

We have had in this country six *puerperal utero-ovarian amputations*, commencing with the case of Storer in 1869. Of these six, all were fatal to the mother but one, viz., that of Richardson in 1880. Five of the six cases were operated upon in private houses; the exceptional one being the last, that of Dr. Parish, at the Philadelphia Hospital, on June 29, 1883. In one case the fœtus was non-viable; in two cases it was dead, and in three it was saved. In not one of the five operations which date since that of Porro, in 1876, was his method entirely carried out. In three cases the modification of Müller was preferred; and in two, although in other steps "Porro operations," the stump was ligated and dropped in. Thus far the adoption of hysterectomy in some of the Cæsarean operations of the United States has given no advantage in a decreased mortality, as compared with the old method. In 1880, the last year of which I have a full report, there were 5 old Cæsarean operations, saving 3 women and 4 children. The time in labour was respectively, four days, sixty hours, thirty-two hours, thirty hours, and three hours, the last being the only elective case. Of 18 old Cæsarean operations known to have been performed in our country since the new method was introduced into Italy, there have been but four that were performed early, and of these, two were successful. One case that was lost was in extremis from *ante-partum* hemorrhage at the time of the operation; the other had a large pelvic tumour, and died of septicæmia. Our estimation of the Porro operation is based entirely upon the comparative records of the old and new methods in the maternity hospitals of Europe. In the United States, where the Cæsarean operations are usually in private houses, the mortality under the old method, when elective and performed early, has been only from 25 to 30 per cent. Three Porro operations have been performed prior to the commencement of labour, with a loss of two cases. The plan is therefore still on probation with us. As the six old Cæsarean cases in hospital in our country all died, it will be well in the future to follow the example of Dr. Parish, and try whether the Porro method will not be less fatal in its results in hospital maternities here as it has been in Italy, France, and Austria.

APPENDIX.—The valuable monograph of Dr. Godson, already referred to, which is a marvel of painstaking research and accuracy, enables me to present the following analysis, carefully prepared and computed from his tables, which cover nineteen quarto pages:—

A Tabular Record, showing the Porro, and so-called Porro Operations, and their respective Mortality in different Countries, to July, 1883.

Porro operations: true and modified.	Italy.		Austria.		Germany.		France.		England.		United States.		Belgium.		Switzerland.	
	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.
1. True Porro operations	43	23	14	5	5	5	10	5	3	2	..	..	3	2	..	..
2. Porro-Müller operations	5	3	12	4	9	5	2	2	1	1	2	1	1	0	2	0
3. Pedicle dropped in: (Porro)	1	1	2	2	2	2	..	..	..	..	2	2	..	..	..	..
4. " " " (Porro-Müller)	..	..	1	1	4	2	..	..	..	..	..	..	..	..	..	..
5. Premature ablation of unopened gravid uterus	..	..	..	..	1	0	..	..	2	0	1	1	..	..	..	..
6. The same; with pedicle dropped in	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..
7. Prévôt ablation of ruptured uterus	..	..	..	..	1	1	1	1	1	1	..	..	..	..	..	..
8. The same; with pedicle dropped in	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	51	29	29	12	22	15	13	8	7	4	5	4	5	3	2	0
Women saved	22		17		7		5		3		1		2		2	

Porro operations: true and modified.	Russia.		Holland.		Spain.		Scotland.		Turkey.		Total.	Women.	Children.
	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Saved.	Saved.
1. True Porro operations	1	1	1	0	1	1	.	..	1	0	82	38	64
2. Porro-Müller operations	..	..	..	..	..	..	..	..	..	..	34	18	26
3. Pedicle dropped in: (Porro)	..	..	..	..	..	..	1	1	..	..	8	0	7
4. " " " (Porro-Müller)	..	..	..	..	..	..	..	..	..	..	5	2	5
5. Premature ablation of unopened gravid uterus	..	..	..	..	..	..	..	..	..	..	4	3	..
6. The same: with pedicle dropped in	..	..	..	..	..	..	..	..	..	..	1	0	..
7. Prévôt ablation of ruptured uterus	1	1	..	..	..	..	..	..	..	..	4	0	0
8. The same: with pedicle dropped in	..	..	..	..	..	..	..	..	..	..	2	0	0
Total	2	2	1	0	1	1	1	1	1	0	140	61	102
Women saved	0		1		0		0		1		61		

1. "True Porro operations," with the pedicle kept out, 82. Of these cases, 44 died, and 38 recovered. Children removed alive, 64; still-born, or moribund, 19; one woman, having twins, removed in a dying state; she was also lost.

2. Porro-Müller operations (the uterus being turned out before opening it), with the pedicle kept out, 34. Women saved, 18; lost, 16; children removed alive, 26; dead, or moribund, 9. One woman bore twins, which were saved, but she was lost.

3. Modified Porro operations, the pedicle being dropped in, after the ablation of the uterus, 8. Women lost, 8; children alive, 7; dead, 1.

4. Modified Porro-Müller operations, the pedicle being dropped in, 5. Women saved, 2; lost, 3; children living, 5.

5. Premature ablations of the gravid uterus (the organ not being opened, the fœtus not viable, and the pedicle being kept out), 4. Women saved, 3; lost, 1.

6. The same, with the pedicle dropped in, 1. Woman lost.

7. Prévôt's operation (the uterus being removed after laparotomy, following the rupture of the organ, and the pedicle kept out), 5. Women lost, 5; children lost, 5.

8. The same operation, with the pedicle dropped in, 1. Woman and child lost.

After the initial operation by dropping in the pedicle, in 1880, was performed, there were six more in imitation of it within six months, all fatal but the seventh. There was one only in 1881; but in 1882 there were four, and there was one again in January of this year. The fact that the seventh and thirteenth cases were the only ones not fatal, should make surgeons hesitate in adopting Veit's method. Operators may be tempted to treat the stump, as they do the pedicle in a large proportion of ovariotomies, but they should know what is taught by the failures of those who have tried it in the past.

Thus it appears from the above record, that the Porro operation, carried out as originally designed, has saved $46\frac{4}{11}$ per cent. of the cases; the Porro-Müller method, unmodified, has saved $52\frac{6}{17}$ per cent.; and the two combined, $48\frac{8}{29}$ per cent. of the women, and 90 out of 118 children.

The 116 Porro and Porro-Müller operations have been performed in the following countries, viz.: Italy, 48; Austria, 25; Germany, 15; France, 12; England, 4; Belgium, 4; Switzerland, 2; United States, 2; Russia, 1; Holland, 1; Spain, 1; and Turkey, 1 = 116.

The cases of dropped pedicle are distributed as follows: Germany, 6; Austria, 3; United States, 2; Italy, 1; and Scotland, 1 = 13.

The chief operators, counting all their forms of incision and treatment, are Professor Carl von Braun-Fernwald, 11, saved 8, and Professor Gustav Braun, 6, saved 2, both of Vienna. Professor Domenico Chiara, of Milan, 5, saved 3. Professor Edoardo Porro, of Pavia and Milan, 5,

saved 4. Dr. Girolamo Previtali, of Bergamo, 5, saved 1. Dr. Heusner, of Barmen, Germany, 4, saved 0. Dr. Just. Lucas-Championnière, of Paris, 4, saved 2. Professor Domenico Tibone, of Turin, 4, saved 1. Professor August Breisky, of Prag, 4, saved 4. Professor S. Tarnier, of Paris, 3, saved 1; and Professor Josef Späth, of Vienna, 3, saved 2 = 28 women saved out of 54. Of the 26 cases lost, there were 5 in which the pedicle had been dropped in.

The record of Italy, kindly sent me by Dr. Domenico Peruzzi, of Lugo, shows that they have had in that country 43 Porro operations, with 20 women saved; 5 Porro-Müller operations, with 2 saved; 1 Porro-Veit operation (the pedicle dropped in), woman lost; and 2 modified Prévôt operations after ruptured uterus (the pedicle dropped in), both women lost.

329 S. TWELFTH ST., PHILADELPHIA.

ARTICLE VII.

LIGATION OF THE SUBCLAVIAN ARTERY BETWEEN THE SCALENI FOR HEMORRHAGE FROM A GUNSHOT WOUND. RECOVERY.

By MIDDLETON MICHEL, M.D., Professor Medical College, South Carolina, Charleston, S. C.

THE case, whose history we shall furnish at some length, will be found to exhibit an exceedingly rare cause of hemorrhage from gunshot wounds, recognized by some, though scarcely referred to by systematic writers on surgery; as when an artery in the vicinage of a shot-wound loses its vitality at the time of injury, through shock, and, subsequently, more completely through prolonged contact with morbid products in the contused and lacerated wound, shares in the general disintegration of the surrounding structures, and yields, in the course of time, to blood-pressure, giving rise to the rarest form of hemorrhage, and from its suddenness, to the most alarming and dangerous.

The aspect of the subject from this pathological standpoint acquires importance, especially to the military surgeon, as such a rare factor imported into the history of a gunshot wound will have much to do in directing his judgment and influencing his decision in granting furloughs predicated of a supposed cure, or of a progressive convalescence.

We are led naturally to take this view of our subject since the following case occurred during our connection with the wounded of our army in Richmond, Virginia, and though immediately reported to the department by myself, and generally talked of among the surgeons at the Capital, has been incorrectly reported in the pages of the valuable volumes on the Surgery of the War, emanating from the Surgeon-General's Office in Washington.

With regard to this particular case, which follows, I may be permitted to say that, when surprise, which is ever sudden, and alarm, which is always associated with hemorrhage from a large vessel so near the heart, are accompanied with the difficulties of the unpremeditated operation required for the patient's safety, one can readily understand the interest it created at the time among the surgeons at the Capital. This interest, again, is enhanced by the simple history of the case, since, of all the varied causes of hemorrhage which could possibly arise from so remote, so unforeseen, so accidental a cause as some obscure and seemingly spontaneous invasion of only one point in the walls of a vessel through the sluggish eliminative process of a slough from the shot-passage, this is so remarkably rare, that it scarcely occurs, on an average, more frequently than once in two or three thousand instances of gunshot wounds of arteries; indeed, a precisely similar instance was unknown to me from any source throughout the Confederate army, at a time in which I was more or less engaged in consulting almost every official report in the department, through the courtesy of Dr. Samuel Preston Moore. The rare occurrence of a local injury precisely where it must involve surgical interference in the course of one of the largest, yet least accessible, of the vessels of the body; and the ultimate success of a procedure contravening the established rule of local deligation in such emergencies, owing to prohibitory conditions of the vessel-walls; with the strikingly large mortality of from 70 to 80 per cent. in all ligations of the subclavian under any circumstances, and at any part of its course; are some of the particulars which surround this case with more than common interest.

As I review the past, at this late date, it seems ominous that in crowded wards, where once lay the mangled bodies of so many suffering and dying men, whose claims upon our untiring devotion were imperative, yet whose histories hold no special place in our memory now, there was one whose comparatively trivial wounds seemed then to call for nothing more urgent than the accommodating attention to his furlough papers, who yet was destined to become more memorable than any of his companions in arms in fixing even his name, as well as the story of his injury, indelibly in our minds. This history, then, may be said to recall the most conspicuous surgical event perhaps resulting from those memorable engagements at Chancellorsville, in which the wounded on both sides numbered 18,000, while no less than 3000 men were killed:—

It was, then, on the 3d of May, 1863, that G. M. Coughman, corporal, Co. K, 13th Regiment of South Carolina Volunteers, aged about 25 years, received his wound from a Minié ball, which entered midway between the vertebral border of the left scapula and spinal column, coursed apparently upward, forward, and to the left, making its exit about two-thirds of an inch below the middle part of left clavicle. There was no primary hemorrhage. Subsequent and oft-repeated hemorrhages from nose and mouth were sufficient to indicate that the pleura had been opened, and the lung

wounded. Hæmoptysis continued from time to time, gradually diminishing until it ceased entirely. Coughman reached Richmond, Virginia, and was admitted into the Manchester Hospital, under my charge, on the 14th of May. His wounds claimed but simple dressings, as there was not more discharge than is wont to occur from such an injury. Absolute rest and decubitus were enjoined, and the cough, which was at first troublesome, having been soon controlled, the subsequent treatment consisted in simple attention to the wounds, which steadily progressed so favourably that in a short time the orifice of entrance in the back completely healed, and the wound of exit below the clavicle had so far closed as to require only a dossil of lint to protect his shirt from the slightest discharge. With returning health and strength he naturally sought to obtain a furlough, which official papers, through recent orders, required to be sent to the field for the signature of General Lee. The delay which this entailed, and long-deferred hope, annoyed him greatly, and it was said that, on permit, he would walk to Richmond again and again to ascertain the fate of his papers; a fact which is here mentioned, as I subsequently learned that it had often been surmised that his health was restored to such a degree that by the time his furlough could be obtained it would be of no avail to him, since, upon an inspection, he would be pronounced well, and would, doubtless, be returned to duty.

On the 2d day of June, I chanced to be detained the entire day at the hospital, not returning to Richmond as usual at two o'clock, when, in the afternoon, I accompanied one of my resident surgeons, Assistant Surgeon Seabrook Jenkins, in his second visit through his wards. We had nearly gone the round when a commotion and alarm in the ward admonished us that something was wrong on the opposite side, where the nurses were endeavouring to suppress hemorrhage in one of the patients by compresses held down upon the chest. We discovered that it was Coughman, seized with a violent fit of coughing, who was bleeding most alarmingly from the wound beneath the clavicle. Arterial blood issuing *per saltum* in so rapid a stream permitted of no delay. I instantly forced my index finger with some difficulty into the wound, breaking through the partly organized, though softened, granulations of the bullet-track, which immediately arrested the hemorrhage. The patient's alarm was exhibited by the beatings of the carotids; I took occasion to assure him that he could bleed no more, that my finger acted as a cork in a bottle; and I requested Surgeon Jenkins to prepare what was necessary for the ligation of the subclavian. Chloroform was administered, and as I removed my finger Dr. Jenkins inserted his, thereby controlling again a hemorrhage yet more considerable than at first, in consequence of the enlargement of the wound. Suspecting the artery not sound in the third part of its course, and that a wound of some depth would certainly be required, ample room became desirable. Depressing the shoulder, I extended an incision the entire length of the clavicle immediately above and parallel to that bone, dividing the structures carefully upon the groove director; a broad clavicular attachment of the sterno-cleido-mastoid required to be divided, and the external jugular vein was drawn on one side; the structures within the supra-clavicular triangle were cautiously lacerated with the blunt end of the director, which brought the scalenus anticus neatly into view with the phrenic nerve. The size of my incision permitted me to prosecute the operation without any vertical incision, and I had the good fortune to encounter no vessel requiring to be secured, meeting neither the transver-

salis colli nor humeri vessels. My finger, introduced deeply into the wound, felt the subclavian artery, and I recognized the tubercle on the first rib, but finding it impossible to depress the handle of Deschamp's needle so as safely to conduct the instrument around the isolated vessel, I divided the belly of the scalenus upon the director, carefully respecting the phrenic nerve, when I readily conveyed the needle armed with its ligature around a perfectly sound part of the artery between the scaleni. We assured ourselves that the subclavian alone, with no branch of the brachial plexus of nerves, was included within this ligature; the artery was then tied securely in this portion of its course; and when my assistant removed his finger there was no hemorrhage.

During the progress of this operation we seemed not to have invaded the cellular tissue at the apex of the lung, the continuity of which, with the mediastinum and thoracic fascia, places us here on the border of the chest, in a stratum of usually very loose tissue, conducting inflammation with its products readily, surely, and dangerously to pleura and pericardium; indeed, the tissue here, beneath, beyond, and around, appeared condensed through the probable deposit of organized fibrin during the prolonged reparative stages of healing throughout the shot-track. The greater part of our incision was now united by sutures and promptly healed without any untoward symptom, the ligature coming away somewhere between the twentieth or twenty-fifth of June; the precise date I cannot now state, as the operation was performed just prior to his transfer to the Alabama Hospital, in Richmond.

I am ready to confess that, from the general experience with gunshot wounds which, in common with many of our surgeons, we had surely acquired, I looked upon the operation at the moment as only of temporary advantage, expecting, in due time, to witness secondary hemorrhage from the distal end of the vessel. This accident, however, never occurred; on the contrary, this soldier made a rapid and perfect recovery, for, up to the day and hour when I last saw him, he was the constant object of jealous interest to me, and remained perfectly free from accidental complications. I should here state that none of us recognized any indication of the paralysis to which reference is made in the report of this case,[1] in which the reporter complacently hints that it was possibly due to some branch of a nerve of the brachial plexus included in my ligature.

There was no more numbness of the limb, nor stiffness of embarrassed motion, than is met with usually after cutting off the main supply of blood to a part; while a prolonged immobility of the limb, on which I had urgently insisted so as to avoid all possible tension or strain upon the vessel, would of itself, from the stiffness ensuing, have imposed the belief upon some inattentive observer that this is what is called paralysis. As was well known to those around us at the time, Coughman left with no such symptom, when, in obedience to an official order, he was transferred temporarily, with all the wounded and convalescent, to the Alabama Hospital in Richmond. . . . .

[1] Surgical History of the War, Part I., vol. ii. p. 538.

The history of this most rare case is pregnant with instructive admonitions, especially to the military surgeon. Engaged as he so often is in determining the safety or danger attendant upon granting furloughs in particular instances, it appears a most important lesson to learn, that the vicinity of a large bloodvessel to the track which a ball has tunnelled through the tissues makes it difficult to declare, until the wound has completely healed for a time, whether or not the main artery is threatened with any anticipative or subsequent danger. Had Coughman's furlough reached him earlier, this appalling hemorrhage must have occurred while upon his journey; yet hundreds with wounds not nearly so well as his were daily on their route homeward. How difficult to defer our decision upon so remote a possibility, where no primary or secondary hemorrhage indicates direct injury of the vessel; still, we must remember that there is a remote hemorrhage, scarcely to be expected, a kind of spontaneous dehiscence of the wall of an artery dependent upon the removal of all support against the blood-wave through the slowly softening and molecular disintegration of an infiltrated and ulcerative, or broken-down point; rare, indeed, in a vessel of the magnitude and importance of the subclavian, though so familiar to us all in the attenuated capillaries along the walls of tuberculous pulmonary caverns.

It was this special cause of hemorrhage as here described, so wholly different from that arising from spiculæ of bone, from fragments of clothing, from ball, or from any other foreign body, pressing upon, lacerating, or temporarily occluding the blood-channel, which makes this case of subclavian hemorrhage almost unique.

I cannot refrain from calling attention to the pertinent reflections of the late distinguished compiler and annotator of the surgical statistics of the war—Asst. Surgeon George A. Otis—who opens his remarks on lesions of the subclavian artery and vein thus:—

"Wounds of these great bloodvessels occasionally come under the surgeon's treatment. It is quite time that the dictum of Jourdan that surgery is powerless in lesions of arteries within the cranial, thoracic, and abdominal cavities should be expunged from the text-books. At least five cases occurred during the late war, of wounds of the subclavian, in which surgical intervention was justifiable, *and in one of these the left subclavian was successfully tied by a Confederate surgeon, for a wound of the vessel where it passes across the first rib.* Though such lesions are immediately mortal in the majority of cases, there are instances in which the bleeding is delayed or arrested, the laceration of the artery being obstructed by spiculæ of bone, or by the missile, or a fragment of clothing, or other foreign substances. In such cases audacity is the part of prudence."[1]

[1] Surg. Hist. of the War, Part I., vol. ii. p. 521. In the above quotation the italics are my own. With Dr. Otis I must express regret that, with official documents before him, Dr. Thomas should, in his report of this case, misspell the patient's name, omit date and name of battle, and date of injury, withhold the surgeon's name who operated, yet go on to state that paralysis existed, and to surmise that some nerve must have been included in my ligature.

Another important feature in this case, not, however, without a parallel in my own personal experience, is the successful application of Anel's method to so large a vessel. The known mortality in ligations of the subclavian artery, excluding pleural, gangrenous, or pyæmic complications, is due to shortness of clot, to numerous collateral branches of large size, and, as I have always believed, to strain or tension upon the vessel in movements of the arm.

This mortality is stupendous, for more than half die in very short periods after the operation, in consequence of recurring hemorrhage from the distal end of the vessel. While such discouraging results would appear due to neglect of the accredited rule of Guthrie, by the defection of some surgeons, yet, as Dr. Otis properly remarks,[1] "the difficulties in dealing with gunshot wounds of the clavicular and axillary regions are so great as often to defy the best planned and most skilfully executed surgical interference; and those whose experience of traumatic lesions of the subclavian and axillary regions is largest are least hasty in criticizing failures in their management."

It is not impossible, nay, it is even most probable, that the histogenetic work of repair throughout this wound, together with consentaneous changes in the walls of the artery, may have obliterated the distal portion of the subclavian so as to deflect the circulation into collateral channels, enlarging the many anastomoses, preparing in advance for the ultimate fulfilment of our purpose. This hypothesis would explain the success of my operation, for secondary hemorrhage may be said to occur nearly always from the peripheral end of an artery on account of the imperfect clot. In no other way do I account for the absence of recurrent hemorrhage. That such obliterations in the calibre of the largest vessels are possible where the vessel has never sustained more than "shock," so to speak, is amply testified to by several necropsic examinations that have been made. Holmes, referring to this subject, says: "About *contusion* of arteries little is really known. It seems undeniable that contraction and even total closure of the artery may follow on mere contusion, and that this may be a cause of gangrene. So Guthrie relates a case in which a bullet passed between the popliteal artery and vein without opening either. Gangrene ensued, and the man died. 'The coats of the artery were not destroyed in substance, though bruised; it was at this spot much contracted in size, and filled above and *below* with coagula.'"[2]

Some years ago, a white man, Mr. Savage, acting as an overseer on Dr. Keith Furman's plantation, on Daniel's Island, received a stab-wound which compromitted the brachial artery just in the neighbourhood of the origin of the superior profunda; the wound was immediately closed with stitches, and a firm compress applied with bandage. Strange to state,

[1] Surg. Hist. of the War, Part I., vol. ii. p. 557.
[2] T. Holmes's Surgery, Am. ed. 1876, p. 107.

the wound in the arm, or skin, healed very promptly, but a traumatic aneurism necessarily ensued. Dr. Furman sent him to the city to me, requesting me to operate. In this instance, though but a few days after the receipt of the injury—in a comparatively fresh wound—in a clear case of pulsating traumatic aneurism of the brachial artery, I nevertheless ligated the axillary in the deepest part of its course in the armpit; the pulsations in tumour immediately ceased, no recurrent hemorrhage ensued, and the recovery was rapid and complete. Here again the Hunter, as above the Anel, method succeeded perfectly. I can but regard success in so recent an injury as an exception to the accepted rule of practice, which it would not be wise always to follow, nor would I have myself pursued precisely this course, but for the expression of the opinion of my colleagues at the time as to the possible condition of the vessel above and below the aneurism.

The minute history which I record forbids my pretermitting some reference to the pulmonary difficulty here involved. Can we lose sight of the frequent hemorrhages from nose and mouth, and the obstinate and troublesome, and, it may be added, almost fatal, cough, which ultimately dislodged the slough or ruptured the attenuated wall of this artery? For some time after Coughman fell wounded at Chancellorsville he continued to suffer from what the field-surgeon reported as hæmoptysis, and, though I never witnessed an attack of veritable hæmoptysis after he came under my care, yet expectoration of mouthfuls of blood and bloody saliva, the result of a constant cough, is well fixed in my memory, for this was about the only symptom for which he was occasionally treated by Dr. Jenkins.

We step upon debatable ground when we are willing to take any single symptom as pathognomonic of lung-wound, for neither hemorrhage, dyspnœa, traumatopnœa, etc., nor even auscultatory revelations, are sufficient to establish clearly a gunshot lesion of the pulmonary tissue; yet the subsequent rupture of the subclavian, which actually indicated the transit of the ball in a direct line from point of entrance to exit, certainly proved that the pleura must have been opened and the lung wounded, independently of any pulmonary symptom. Even if we indulge the missile in the most eccentric deflections around the thoracic cage, it seems to me impossible that this artery could thus have suffered. This pulmonary wound was followed, however, by no serious complications, for there was neither traumatic pleurisy nor pneumonia; abscess nor effusions; though pleurisy is so likely to follow chest-wounds where the ball has never penetrated the pleural cavity, nor even wounded the pleura. Here, then, again, is an important point in the case. Recovery under these circumstances might very well surprise us had we not been familiar with wonderful recoveries after the most serious injuries of the lung; one of the most marvellous, perhaps, of which was brought before our Association of Army and Navy Surgeons by Dr. W. G. Thom, a synoptical but full report of which, from my pen, was published in the *Confederate*

States Medical and Surgical Journal for April, 1864, and copied into the second volume of the Surgical History of the War, page 597. In this instance the pleura and lung were terribly wounded, and an English patent-lever watch, with portion of its accompanying chain, etc., was driven into the chest. Imbedded in the lung for some time, during the process of granulation, while dressing this wound, the watch was discovered by its metallic lustre, when the greater part, together with the links of the chain, was removed, the wound gradually healed, cough continued, and in course of time the patient expectorated all the small works of the watch, which are said now to be in his possession. As severe an injury as this well-attested example affords was nevertheless unaccompanied by any of those reasonably-to-be-expected pathological sequels of which we have spoken above, at least not to a fatal extent.

If we have dwelt tediously, it may be, upon Coughman's case, it has been because we believe that any reflections upon attempts at occlusion of the subclavian artery by ligature, and the results which may have followed the operation, present at once a subject of momentous interest to the surgeon on account of the rarity of the event. Dr. T. G. Morton, of Philadelphia, tells us that at the Pennsylvania Hospital between the years 1835 and 1868 the subclavian had been tied but once, with a fatal result.[1]

The operation is rare *per se*, and the special condition to which we have called attention is still more so. In certain instances where it is said to have been done, the circumstances influencing the result will be found to be wholly different, as where the vessel has been tied for an aneurism, which may of itself have secured all danger from distal hemorrhage; or for some lacerated wound from a railroad accident which has torn away the shoulder, and the artery in its extreme third portion of its course is picked up with a tenaculum and secured to save the patient from dying immediately. How great must have been the immortal fame of the illustrious American, Valentine Mott, of whom Dr. Gross says, "No surgeon, living or dead, ever tied so many vessels, or so successfully," when we learn that he ligated this vessel alone eight times! During the Franco-German War, Prof. Billroth performed the operation three times, and saw it executed twice by other surgeons, yet of these five ligations during that war one only of these patients is *believed* to have ultimately recovered.

With no more appropriate words can I close these remarks than with those of Dr. Otis: "Since the achievement of Dr. Billroth and others in the recent Franco-German war, I am led to regard the management of wounds liable to involve the great vessels at the upper part of the chest as perhaps the most important field of study for those who occupy themselves with questions of what the French term *la haute chirurgie*."

CHARLESTON, July, 1883.

---

[1] Am. Journ. Med. Sci., April, 1876, p. 334.

ARTICLE VIII.

GALVANO-PUNCTURE FOR THE CURE OF ANEURISM. By T. R. CHAMBERS, M.D., of East Orange, N. J.

THIS operation deserves more recognition in this country than it has obtained.

The following experiments were undertaken in the study of the subject. The case reprinted is from the *Bulletin of the New York Pathological Society*.[1] Perhaps the adverse criticism which it has received may not seem quite justified when attention is called to certain points in the case.

An albuminous fluid held in the palm of the hand was subjected to the influence of a galvanic current from twenty-one cells of a Stöhrer battery. Two needles acted as poles. Great electro-chemical action took place. There was no pain, notwithstanding the proximity of the poles to the skin, as long as they did not touch it.

A sheep's gall-bladder was thoroughly washed out. Two short glass tubes were fastened in openings made in it, opposite each other. One of the glass tubes was connected with the carotid artery of a healthy calf and its blood was diverted into the collapsed gall-bladder, which, when it became distended, pulsated like a real aneurism. The escape of blood from the bladder was controlled by sufficient digital pressure upon a rubber tubing attached to the second glass tube to simulate the condition of obstruction existing in the exit of blood from the aneurismal sac. This imitation aneurism, 8 x 5 x 5 centimeters in size, pulsated for five minutes fed by the blood of the calf's carotid. It was then disconnected and immediately opened—it contained no coagulation.

A bladder similarly arranged was connected with a calf's carotid, and when it began to pulsate, a needle insulated for half its length was plunged into its interior. This needle became the positive pole of a twenty-one cell galvanic current, while the negative pole was applied by coils of wire externally. The current was continued for five minutes when the bladder was disconnected as before and immediately opened. The needle was found in the centre of a firm, hard coagulum 3 x 2 x 1.5 centimeters in size.

Another calf was taken and both poles were introduced into the pulsating bladder arranged as before. The result was unsatisfactory; froth, gas, and tar seemed to be generally commingled when the bladder was cut open, though there was some firm substance about the positive needle.

Then in still another bladder two needles were introduced and the current alternated, with a like unsatisfactory result.

From these experiments, I think, an idea of the relative value of the different methods employed may be gathered. Of course there are many

[1] Volume for April—November, 1881.

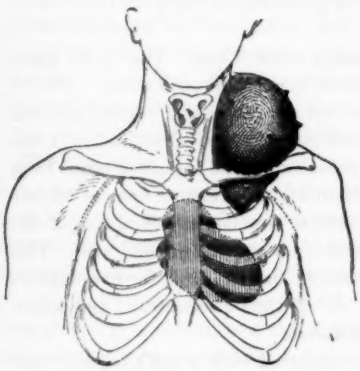
objections in likening these crude imitations to the true aneurism as it occurs in man. Yet, if nothing more, it shows that the positive needle only should be introduced into the tumour. The pain is only what occurs with the prick of a pin.

Suppose the current of blood in an aneurism could be stopped by distal compression for fifteen minutes or longer, and the positive pole inserted for five minutes in three or more different places, does it not seem impossible for the sac to escape entire consolidation?

The results obtained agree with the conclusions of Robin, quoted hereafter.

The following case, presented to the New York Pathological Society, is published at this time because unfavourable criticism of the operation has appeared.

The man was apparently about to die, and desired to try galvano-puncture in the full knowledge of our inexperience in this country. The operation, notwithstanding the alternation of poles, no one can say hastened his death an hour. He lived four months and a half after it, and during *three months* of this time was in comparative comfort, many of the distressing symptoms disappearing. This fact remains whether *post* or *propter hoc*. The author believes with others that if the positive pole alone had been introduced as before suggested, cure would certainly have resulted, and the man spared to a life of usefulness. The accompanying figure is a very nearly true representation of the pathological condition of affairs during the last week of the man's life. It shows an immense tumour quite as large, if not larger than the unhypertrophied heart; the places of pouting; the inclusion of the first and second ribs and clavicle; the atrophied arm.



Andrew J. W., United States, aged fifty-three, married, a printer. Inheritance and habits good; no syphilis; one attack of rheumatism, lasting one month, in his ankles, about twenty years ago.

The first symptoms of aneurism began three years ago with pain in the little finger of his left hand, and gradually extended into the arm and whole upper extremity. In January, 1880, the subclavian aneurism had become a prominent tumour upon the left side of the neck, with visible pulsation, thrill, and bruit. The pain was chiefly referred to the upper extremity, scarcely any being felt in the tumour itself. Iodide of potash had been administered during the past year, continuously. At times large

quantities of morphine were necessary, and occasionally his mental disquietude required the addition of a mixture of chloral and camphor, equal parts; which proved of great service for disturbed sleep, and calmed his maniacal tendencies. Dr. R. F. Weir examined the patient and found a continuous bruit across the manubrium sterni, that did not seem to be cardiac; but which, together with the patient's complaint of pain in the cervico-dorsal spine, led him to suspect dilatation of the arch of the aorta. The cardiac physical signs failed to reveal any pathological changes. The tracing of the left radial pulse, obtained with great difficulty on account of the smallness of the current, yielded the usual wavy descent found with obstruction along the course of an artery. In March, there was œdema of the left upper extremity, as well as of both ankles, and the doses of morphine had reached the enormous quantity of thirty centigrammes in a single day.

On March 30th, he had a sudden attack of dyspnœa, and for two weeks was compelled by weakness to remain in his chair, being unable to walk: dorsal decubitus was uncomfortable. On April 23d, he had a chill and fever, with abdominal pain and swelling; and the same symptoms were repeated on May 31st, when the abdominal swelling assumed quite an extensive size, requiring surgical interference to evacuate a cupful of pus, from an abscess in the abdominal wall.

On May 19th, a plaster cast was taken of the shoulders and neck. There was a large tumour rising above the left clavicle, between it and the trapezius behind; bounded externally by the acromial end of the clavicle, and rose internally almost to the border of the inferior maxilla.

There were at no time symptoms of pressure upon the trachea or carotid, but only signs of compression of the nerves of the left cervical plexus and of the veins of the same region, together with a diminished blood supply.

Oct. 8. The aneurism has slightly increased in size and shows a tendency to pointing; and the pain in the region supplied by the brachial plexus has become so excruciating that the patient wished to try anything (!) to relieve his sufferings.

Needling.[1]—Six milliner's needles four and a half centimeters long were introduced, and on the next day nine more were inserted into the tumour, care being taken to avoid the direct blood current. Some of the needles gave slight pain on piercing the skin, others none. After remaining imbedded in the tumour for six days, the needles were removed; there was no apparent change in the aneurism.

24th. There is visible pulsation and expansion in every available part of the tumour. A thrill is felt posteriorly adjacent to the neck, and a distinct bruit is heard everywhere, especially over the region of the thrill. The blood current approaches the surface in several places, and very threateningly at points of pouting.

Galvano-puncture.—With the kind advice and assistance of Dr. E. Evetsky and Dr. G. L. Knapp, galvano-puncture was resorted to. The apparatus employed was a Stöhrer's battery of twenty-one cells; a rheostat by which the intensity of the current could be gradually raised or lowered between a single couple and the full strength; and six milliner's needles, eight centimeters long, with their points changed to sharp, flattened spear-heads; the latter were insulated by collodion, which increased their size from No. 2 to No. 4, French. Three centimeters of polished steel of the needle were to be exposed in the tumour.

[1] See Heath on this operation, Lancet, January 31, p. 168.

First séance.—The patient being etherized, two needles were inserted parallel to each other, two centimeters apart; then a strong galvanic current was passed through them and the poles alternated every five to eight minutes. They remained inserted about forty-five minutes. When withdrawn a peculiar black-and-blue appearance of the whole upper extremity was noticed. One of the needles had lost its exposed steel, which had been utterly consumed, not broken off—an accident which has happened to some experimenters; the other needle was rough, black, and thinned. Their removal was accompanied by the escape of gas and tarry fluid. The patient passed pleasantly out of the etherization. Slight change in the shape of the tumour was observed; the thrill was diminished; and there was a seeming condensation of the contents of the aneurism beneath one of the punctures.

For four days there was no change noticeable in the tumour nor in the patient's condition, which was very good.

Second séance.—Oct. 29. On this occasion it was with considerable difficulty the patient was etherized. The current passed through two needles inserted as before. Within five minutes of starting up the current, a scarlatinoid rash appeared on the left shoulder and upper extremity, and gradually darkened and became black and blue in irregular patches. The thrill disappeared. On withdrawing one of the needles, a subcutaneous hemorrhage at the puncture occurred, forming a secondary hæmatoma almost as large as the aneurism itself, but pressure finally controlled it. After fifteen minutes' interval, two fresh needles were introduced in other places near the thin parts of the sac, and the current was passed as previously described, alternating the poles every five to eight minutes, until the whole *séance* lasted forty minutes. On withdrawing one of the needles, a bright arterial stream spurted out of the puncture, but this was soon controlled by pressure.

The patient did not come out of the etherization, but went into a state of coma, from which he only partly emerged two days later, but with external strabismus and almost constant nausea and vomiting. For four days after, there was severe headache and complete loss of vision even to recognition of light. The black and mottled appearance of the arm gradually disappeared at the end of a week; and blebs, which had formed upon palmar surfaces of the second and ring fingers, gradually dried up after two weeks; ecchymotic spots scattered over the arm and hand also disappeared.

With the exception of these two weeks, for *three months* after the operation there was a great amelioration of the symptoms, so that the patient only had to take an occasional dose of morphine. During the latter part of February, 1881, the pain in the tumour became very severe; formerly the pain had been confined to the shoulder, arm, and hand.

March 6 (*four months and ten days since the galvano-puncture operation.*) The tumour attained to the size of a baby's head, and had three places of pouting where the sac wall was scarcely the thickness of paper. His body was constantly bathed in perspiration; his mind wandered; vision was completely lost; but hearing was very acute. He refused to swallow any nourishment, lest in the effort the aneurism should burst; but at 2 A. M. the upper place of pouting gave way while the patient was at stool, the blood squirted across the room and struck the opposite wall, and oozing continued for four hours, notwithstanding the pressure applied.

On March 9th, a second rupture occurred from another place of pouting, and oozing lasted for half an hour.

On March 10th, a third hemorrhage from a re-opening of the upper place of pouting occurred, and it required digital pressure for an hour and a half to stop it.

14th, 12.30 A. M. Patient was drawn up in bed for half an hour by agonizing pain in the tumour, when suddenly his pain was relieved and he died quietly. There was a slit two centimeters long in the upper anterior part of the tumour.

Autopsy, twelve hours after death.

Body not emaciated; features placid; no œdema. There is a depression in the suprascapular region, where the tumour had existed; and the left upper extremity was atrophied.

Abdomen.—The subcutaneous adipose tissue was abundant. The muscular layers on the right of the median line, where the umbilical tumour[1] had presented, were thinned. Peritoneal adhesions over a surface an inch square anteriorly upon the right lobe of the liver; *none elsewhere.* There was injection and slight thickening for a space the size of the palm of the hand at the site of the abscess in the right lumbar region. *Vermiform appendix* normal; *intestines* also.

Thorax.—No adhesions; there were no signs of pressure upon the sternum or the spine. *Heart*, in normal position, firmly contracted, hard and anæmic; *no hypertrophy;* in fact the left ventricular wall seemed thinner than it should be, and its muscular tissue was brown. Aortic valves slightly atheromatous and thickened.

Kidneys, both of normal size; capsules not adherent; slight increase of connective tissue in cortex.

Spleen, not abnormal; liver slightly large, somewhat fatty.

Aorta.—Immediately upon leaving the valves the arch was greatly dilated in circumference and length throughout. Its lining membrane had numerous elevations and depressions, indurations and scars, ulcers of recent endarteritis and cicatrices, so that there was scarcely any normal appearance. The openings of the innominate, left carotid, and subclavian and of the descending aorta were enlarged and atheromatous. The descending aorta was normal, except at its commencement. There was a branch given off just below the innominate artery, which probably supplied collateral circulation to the upper extremity. The branches were all given off near the descending aorta. The dilatation was more extensive between the aortic valves and the innominate than elsewhere.

The subclavian artery branched off just above the opening of the descending aorta, and for eight centimeters it was irregularly dilated and atheromatous; it had two or three very small branches and blind pouches, and emptied by a constricted ring into the *subclavian aneurism*, which was a pear-shaped tumour about thirteen centimeters long and nine wide at its base, extending, when distended, from the inferior maxilla to the second rib; lying upon it and the first rib, which was included in its cavity; and in close apposition with the carotid artery and side of the neck. Behind, it pressed upon the cervical plexus; externally, upon the scapula and clavicle; and anteriorly upon the clavicle, which was also included in the aneurism for a distance of four centimeters. Both the first rib and clavicle were eroded. The sac itself was thin in places, but strengthened by laminated blood-clots. The six punctures made by the galvanic needles were readily seen, and one was in the centre of a black infiltration, one centimeter square. There did not seem to be any connection between

[1] Reported in the New York Medical Journal, December, 1880.

the blood-clots and the punctures. There were a number of dark clots adhering to the sides of the aneurism, which could be washed off by a gentle stream of water. The fatal rupture did *not* start from a puncture. A few small arterial twigs were seen, and the axillary artery was only about the size of the lead of a lead pencil. There were no vestiges of the first needling operation.

This case is interesting for a number of reasons: First, on account of the rarity of subclavian aneurism on the left side; and on account of the long duration of the disease in its advanced condition; the patient carried a pulsating tumour upon the side of the neck for two years and a half, and a fortnight before death it was as large as a child's head. Three hemorrhages through openings in the sac occurred during the week before the fatal rupture. Were the strange sequences due to the galvanic current, to the etherization, to blood-poisoning, or to embolism and thrombosis? There is no doubt a large quantity of foreign matter was thrown into the circulation by the decomposing action of the electric current upon the steel needles and the blood. A clot formed at the positive pole was broken up when the poles were alternated. There were no casts in the urine, and but a faint trace of albumen at any time.

The autopsy revealed a second aneurism of the arch with extensive ulcerative endarteritis of the same; it also confirmed the diagnosis that the iliac abscess was confined to the abdominal wall, and showed that, notwithstanding the immense obstruction to the circulation by the two aneurisms, the heart was not hypertrophied nor was there insufficiency of the valves.

Galvano-puncture, for the cure of intra- or extra-thoracic aneurisms has scarcely had a fair trial in this country, while in Europe it has had careful study. The first cure reported was that of Petrequin, in 1845, of a temporal aneurism. Then followed a number of failures, and the Italian Commission formed at this time was very sceptical. In 1846, Ciniselli tried it for the cure of aneurisms of the aorta. England, Germany, and France have had many experiments, and especially valuable have been the results obtained by Dujardin-Beaumetz and Dr. Laurent Robin.

Robin says: 1. It is scientific and rational, and yields practically good results. 2. It is the best therapeutical agent employed thus far, for it determines in an aneurismal sac the formation of a clot susceptible of organization. 3. The positive pole alone should be introduced into the tumour to obtain a firm and resistent clot. 4. This mode of treatment, when employed with all the precautions pointed out in his work,[1] is devoid of all danger of embolism, hemorrhage, suppuration, gangrene, or of any other unpleasant accident. It invariably procures relief even in desperate cases.

An old idea was that coagulation was due to inflammation of the sac surrounding the punctures; another was that the electric current itself

[1] De l'électro-ponture dans la cure des anévrismes intrathoraciques, 1880.

caused clotting (Dr. Smee[1] passed oxygen and hydrogen through an albuminous fluid, and obtained a substance resembling fibrin). Robin is certain "that coagulation is due to the chloride of iron and acid formation of the positive pole, while it is generally agreed that the gelatinous froth of the negative pole does not tend to organization." He says further, "the operation is painful, but this is relieved by etherization." If I have the opportunity again, the operation shall be done without ether, for it is *not* necessarily a very painful operation. The gas formed in the aneurism is never sufficient to embarrass the patient. The needle punctures may be so small that there need be no fear of hemorrhage, especially if pressure may be applied.

"The current should not be less," says Robin, "than about twenty-one cells of a Gaiffe, Bunsen, or Stöhrer battery; it should gradually be increased from zero to the greatest intensity, and *vice versa;* and it should be continued about five minutes upon one needle, then upon another, inserted a short distance off, and so on upon several needles, it should *not* be alternated. When the two poles upon two needles are introduced the action is more energetic, and the clot is formed more rapidly, but is imperfect and soft. No clot is formed by the negative needle, but that of the positive is solid, resistent, and adherent." It seems probable that in the case just cited the induration within the tumour was changed, when the currrent was alternated, from a firm consistency to a frothy, gelatinous, and easily removable matter. Perhaps so much foreign substance thrown suddenly into the circulation was the primary cause of all the peculiar phenomena of central disturbance following the second *séance.*

Robin thinks the clot is due solely to chemical changes, and suggests always using iron or steel needles, rather than platinum, zinc, or silver. The clot, he says, is a coagulation of albumen, solidification of fibrin, and an exudation of plastic lymph.

With regard to the battery, it is necessary that it consist of about twenty-one small elements, as these produce the least amount of thermic action, and the greatest intensity of electro-chemically decomposing and destroying power. The battery of large surface elements is useful as a galvano-cautery; the smaller in coagulating or dissolving, according as the positive or negative pole is used.

An extensive bibliography of the subject may be found in Robin's work, and the statistics of the work are easily summarized. In a table there would be found a great many cases under the heading of amelioration referring to lessening of pulsation, arrest of development of the tumour, relief of pain, partial or complete, and alleviation of the dyspnœa. In most cases there would be only one *séance*, in others even a dozen or more.

Ligation had 33.1 per cent. of death, and galvanism only 12.9 per cent., including the bad success of Ciniselli (Norris's table of ligatures).

[1] Royal Soc. Trans. 1863.

Hutchinson, in 1856, compared it with compression, and found 25 per cent. success, and 29 per cent. failure in compression; while galvanism counted 24 per cent. success, and 30 per cent. failure. But if the positive pole alone be introduced as before mentioned, the statistics shall be wonderful in *cures*.

ARTICLE IX.

CLOSURE OF THE JAWS AND ITS TREATMENT, WITH THE REPORT OF A CASE IN WHICH COMPLETE OCCLUSION FOLLOWED A GUNSHOT WOUND OF THE LEFT SUPERIOR MAXILLA, RECEIVED AT TWO AND A HALF YEARS OF AGE, AND WHICH WAS RELIEVED EIGHTEEN YEARS SUBSEQUENTLY BY OPERATION ACCORDING TO A NEW METHOD.[1]

By J. EWING MEARS, M.D., Prof. of Anatomy and Clinical Surgery in the Penna. College of Dental Surgery, Demonstrator of Surgery in Jefferson Medical College, etc.

CLOSURE of the jaws exists, as is well-known, under two forms—the spasmodic or temporary, and the chronic or permanent. The former occurs usually in connection with some condition which produces irritation in the motor filaments of the third division of the fifth nerve, causing spasmodic contraction, notably of the masseter and internal pterygoid muscles. Among the causes may be enumerated delayed or difficult eruption of the third molar or wisdom teeth of the lower jaw, the development of tumours from the external surface of the ramus and body of the lower jaw, alveolar abscess in connection with the posterior teeth, necrosis, suppurative tonsillitis, and finally I have observed it to follow operations upon the lower jaw when performed in the molar region.

For the relief of these conditions the treatment consists in the removal of the causes. When dependent upon the impeded eruption of the wisdom tooth, the mouth should be opened by levers under the influence of an anæsthetic agent, and the second molar tooth should be extracted so as to afford space for the third molar, or, if it is found to be an imperfectly developed tooth, as sometimes happens, the offending organ should be removed. For purposes of mastication, the third is regarded as of less value than the second, and it would seem, therefore, to be better practice to remove it in all cases. Where tumours, necrosis, and areolar abscesses exist as causes, the treatment is obvious. After operations in the molar region of the lower jaw, antispasmodic remedies should be administered and water, as hot as it can be borne, should be held in the mouth in contact with the parts so as to allay irritation.

In permanent closure of the jaws we have quite different conditions to

[1] Read at the meeting of the American Surgical Association, held in Cincinnati, Ohio, June 1, 1883.

deal with. The contraction is not due, in this form, to the perverted function of pre-existing structures, but to the formation of adventitious tissues, which firmly and permanently lock the jaws and in some forms defy successful removal. Although not a very unusual occurrence, it would appear, from an examination of surgical text books, that the description and treatment of this truly distressing condition have not, until a recent period, claimed the attention their importance deserves.

In vol. iii. of the third American edition of Velpeau's Surgery, edited by Dr. Valentine Mott, of New York, the latter, under the caption of Concluding Remarks, records sixteen cases which came under his care from 1812 to 1843, and in which he operated with great success, accomplishing *perfect cures* in all instances save one. He enumerated three causes upon which "immobility of the lower jaw" depended. The first and most frequent cause was the formation of unyielding cicatrices, resembling, as it were, *adventitious ligaments*. A preternatural rigidity or dynamic contraction of the muscles was stated as the second, and the formation of an osseous plate of bone connecting the upper and lower jaws was given as the third cause. His process of surgical treatment consisted in the use of an instrument constructed upon the screw and lever principle with which the jaws were forcibly separated. The instrument employed was devised by Scultetus, and depicted in his Armamentarium Chirurgicum. In one case (in 1831) all efforts to separate the jaws were ineffectual, and he regretted myotomy was not known at the time the operation was performed, for he was persuaded that subcutaneous division of the masseter muscle would have liberated the jaws, and resulted in rendering complete his list of perfect cures. With the expression of high respect for the opinions and statements of this distinguished surgeon, I cannot think that he was afforded the opportunity of examining, at the expiration of a sufficient period of time, the results of his method of operation in the cases recorded.

In the Jacksonian Prize Essay of 1867, Mr. Christopher Heath, of London, recorded cases in which he had performed operations for relief of permanent closure of the jaws, and in a chapter devoted to the subject collated the work of others up to that date. According to Mr. Heath's statements, English text books on surgery were remarkably barren of any information upon the subject. He alludes to a reference of Mr. Cooper, in his Surgical Dictionary, to a case treated by Dr. Valentine Mott, in 1831, in which an operation was performed for closure of an opening in the cheek caused by sloughing and accompanied by closure of the jaws. In the edition of Cooper's Dictionary, issued in 1861, closure of the jaws is described as occurring after "sloughing of the cheeks and gums from profuse salivation, the cicatricial bands being so rigid as scarcely to allow of the separation of the teeth, but they became more pliant in time." The latter part of this statement, Mr. Heath very justly says, is not borne out by general experience. Due credit is given to our distinguished President,

Prof. S. D. Gross, for giving "by far the most complete account of the affection in his large work on Surgery."

Prof. Gross, in the first edition of his Surgery, states, as the most common cause, according to his observation, "profuse ptyalism followed by gangrene of the cheeks, lips, and jaw, and the formation of firm, dense, unyielding inodular tissue, by which the lower jaw is closely and tightly pressed against the upper. In the worst cases there is always extensive perforation of the cheeks permitting a constant escape of the saliva and inducing the most disgusting disfigurement. A second cause is given as anchylosis of the temporo-maxillary joints, consequent upon injury or arthritic inflammation. The formation of an osseous bridge, uniting the jaws or extending from the lower jaw to the temporal bone, is assigned as the third cause. The effect of the closure is stated to be a serious interference with mastication and articulation, and if it occur early in life it is often followed by a stunted development of the jaw.

With regard to treatment, Prof. Gross states that anchylosis of the temporo-maxillary articulation may be relieved by forcibly depressing the lower jaw with wedges or levers, an anæsthetic agent having been administered. In order to prevent re-formation of the adhesions, the lever is to be used daily for many months or years. When the immobility depends upon the presence of inodular tissue, the proper remedy is excision of the offending substance—an operation which is both tedious, painful, and bloody, and unfortunately not often followed by any but the most transient relief owing to the tendency in the parts to reproduce the adhesions, however carefully and thoroughly they may have been removed. After the excision is effected, the patient must make constant use of the wedge, wearing it for months and years so as to counteract the tendency to reclosure. In a large experience, Prof. Gross found that but few patients were permanently relieved by operations of this kind. Where immobility of the jaw is caused by the formation of an osseous bridge it may be remedied by the removal of the adventitious substance by means of the saw and pliers. Sometimes, however, such a procedure is rendered inexpedient on account of the long duration and excessive firmness of the anchylosis and the large quantity of the new osseous tissue.

In cases of long standing it is recommended to divide the masseter muscle subcutaneously and with great care, lest important vessels be divided. Plastic operations may be performed to close the gap in the cheek which may follow salivation.

I have made these liberal quotations from Prof. Gross's work in order to show how little confidence was reposed in the methods of operation then in vogue in this country at least, and how unsatisfactory the results were which followed their employment.

In 1855, Dr. Friedrich Esmarch, Professor of Surgery in the University of Kiel, read an essay at the Congress at Göttingen on the "Treatment

of Closure of the Jaws from Cicatrices."[1] In this essay he gave an elaborate description of the anatomical relations and histological characters of the mucous membrane of the cavity of the mouth, as well as of the pathological conditions which occur in cicatricial formations in this membrane. He described the outer space, or buccal cavity as it is termed, between the alveoli and teeth and cheek and lips as an elastic dilatable sac, and showed that as soon as this sac shrinks together, loses its elasticity, or is replaced by a rigid substance, the mobility of the jaw must either be impaired or entirely cease. After ulceration or sloughing of the mucous membrane, cicatricial contraction ensues, which the depressors of the jaw cannot overcome. If the cicatricial tissue is entirely excised, re-formation of a cicatrix, possessed, if anything, of greater powers of contraction, takes place. Mechanical appliances, it is true, such as the metal shields of Mr. Clendon, of London, dentist, may retard and limit, to a certain extent, this formation, but it requires their constant use for long periods of time, and under very painful and trying conditions to the patient. In order to supply the place of the destroyed mucous membrane, Dieffenbach suggested, after division and separation of the cicatrix from the bones, the covering of the raw surfaces with sound mucous membrane transplanted from an adjacent part. In the most favourable cases this is almost impossible, owing to an absence of sufficient healthy mucous membrane near by. Jaesche, in 1858, recommended the use of a flap of skin instead of mucous membrane, which may be also difficult to obtain from a favourable point. Esmarch, however, would not hesitate to take a flap of skin from so remote a part as the arm. In view, therefore, of the pathological conditions which exist in these cases, and of the great difficulties presented in overcoming them, as well as the failures which followed efforts made, Esmarch recommended the formation of an artificial joint in front of the contraction, in order to give the other half of the jaw some, although a limited, motion. This joint was to be formed by the excision of a segment of bone of such size as to prevent union of the divided ends, and the operation was performed by an external incision along the base of the jaw.

Although this operation was suggested by Prof. Esmarch in 1855, the method was not employed until 1858, and then by Dr. Wilms, of Berlin.

In 1857, shortly after the suggestion of Esmarch had been made, Prof. Rizzoli, of Bologna, operated for permanent contraction of the jaws by a simple division of the lower jaw in front of the cicatrix, using for that purpose powerful forceps applied within the mouth. In order to prevent union he inserted a piece of gutta percha between the cut surfaces of bone, which procedure, it is stated, was accomplished successfully. Satisfactory results have been achieved by English and Continental surgeons by the

[1] Die Behandlung der narbigen Kieferklemme durch Bildung eines künstlichen Gelenkes um Unterkieferkiel, 1860.

employment of both of these methods. Many years before, Dieffenbach had endeavoured to relieve the closure of the jaws by the division of the ramus of the jaw, and in this manner obtain the formation of an artificial joint. This method of operation was not followed by complete success.

In cases where closure results from anchylosis of the temporo-maxillary articulation, Mr. Heath recommended either division of the bone or resection of the joint, giving preference to the former on account of the ease with which it could be performed from within the mouth "by dissecting up the mucous membrane and masseter muscle so as to introduce a narrow saw or strong bone-forceps and dividing the ramus as high up as convenient, and thus establishing a false joint as originally proposed by Dieffenbach for cicatricial contractions.

He also quotes from Sédillot the case of true anchylosis in which M. Grube, in 1863, divided the ramus of the jaw from within the mouth with a straight chisel, and in this way formed a false joint. The masseter muscle was subsequently divided subcutaneously, and the cure was permanent.

In the last edition of his work on Surgery, Prof. Gross refers to the two methods suggested by Mr. Heath, neither of which he characterizes as very promising nor easy of execution. He reports a case of complete synostosis of the lower jaw on the left side, the result of rheumatism, in a girl seven years of age in whom, in 1874, he exsected the condyle along with a portion of the neck of the bone, and succeeded in establishing excellent motion. The parts were exposed by a curvilinear incision in front of the ear with hardly any loss of blood, and the condyle was prized out of its socket by means of an elevator which combined the principles of a lever and a knife.

Under the date of Dec. 6, 1845, Dr. John M. Carnochan, of New York, in a communication addressed to Dr. Townsend, translator of Velpeau's Surgery, called attention to the fact that he was the first to put into practice the division of the masseter muscle, and the first to propose simultaneous division of the masseter and temporal muscles of one or both sides, and the formation of an artificial joint on the inferior maxillary, either by simple division of the bone or by exsection of a portion of it as a remedy for immobility of the jaw. In this communication he reports at length a case upon which he operated in 1840. After dividing the adhesions and applying the screw lever, he failed to separate the jaws; he then divided the masseter muscle subcutaneously with a narrow tenotome, and again applied the lever. Again the efforts were without avail, and before resorting to division of the temporal muscle, as was his intention, he reapplied the lever, and under the force employed the jaw was fractured in its body. The patient could now open the mouth to the extent of an inch and a half. The result following this accident, and the successful attempt of Dr. John Rhea Barton, of Philadelphia, to form an

artificial joint in the femur, suggested the application of this principle to the lower jaw. With the intention of putting this plan into execution at a future day, the union of the fractured bone was permitted to take place, and the jaw became again immovable, with a slightly increased space between the teeth. So far as I am able to ascertain, the operation suggested was never performed. The inference he drew from the results in the case was that mere fracture or section of the inferior maxilla, even accompanied by repeated and free motion, would be insufficient to produce an artificial joint, and that to fulfil this indication the entire exsection of a portion of that bone (towards the angle or at some other locality which the nature of the individual case might suggest) would be necessary. It will be seen from this statement of Dr. Carnochan that the operations described as that of Esmarch and of Rizzoli were, in fact, suggested by him some fifteen years previous to the presentation of the essay of Esmarch at the Congress at Göttingen.

A *résumé* of the methods of operation which have been suggested for the relief and cure of permanent closure of the jaws shows that they have been as follows:—

1*st*. Excision, more or less complete of the cicatricial bands or osseous formations, and the subsequent employment, for a long period of time, of wedges and levers to retain the separation of the jaws. Transplantation of mucous membrane to cover the surface of the wound as suggested by Dieffenbach, or transplantation of skin as practised by Jæsche.

2*d*. Division of the cicatricial tissues, and the adaptation of metal shields, not only to prevent re-contraction, but to re-establish the sulcus of mucous membrane at the base of the alveolus.

3*d*. Dieffenbach's method of simple division of the ramus of the jaw—and a formation of a false joint *behind* the point of contraction.

4*th*. The formation of a false joint as originally suggested by Carnochan. Esmarch's suggestion that it be formed in front of the contraction, and that a segment of bone be removed for this purpose—by external incision.

5*th*. The formation of a false joint *in front* of the contraction by simple division of the bone, made by forceps applied within the mouth—Rizzoli's method. In closure due to anchylosis of the temporo-maxillary articulation, the methods practised are:—

1*st*. Division of the ramus of the jaw from within the mouth, either by saw, forceps, or chisel, and the formation of a false joint.

2*d*. Exsection of the condyle with a portion of the neck, the incision being external.

A patient having presented herself to me for relief from permanent closure of jaws of long standing, due to cicatricial contraction, I had occasion to study the various methods of operation which had been proposed for this form, and became impressed, as the result of this investigation, with the fact that, objections more or less valid, could be urged against each,

and that it was possible to carry into execution successfully a method with the hope of securing better results. Moreover, in two cases I had failed by the plan of excision, and the use of levers to accomplish satisfactory results, and I had witnessed similar failures in others. The objections in cases of cicatricial contraction against the methods of operation above enumerated may be stated as follows:—

1*st*. Excision.—The re-formation of the cicatrix and the great pain to which the patient is subjected in the use of wedges, levers, and screws—the difficulties of securing flaps of mucous membrane and skin from adjacent parts and their successful transplantation. The almost universal failures.

2*d*. Division and Use of Shields.—The pain and inconvenience experienced by the patient in the use of the shields, and difficulty of obtaining the full coöperation of the patient in carrying out the necessary manipulations within the mouth.

3*d*. Division of the Ramus *behind* the Contraction.—Dieffenbach's Method.—The difficulty of obtaining a permanent false joint after simple section of the bone, and without division also of the overlying masseter muscle.

4*th*. Carnochan's Method as practised by Esmarch.—The loss of one-half of the jaw for the purposes of mastication, where excision is made in front of the contraction. Its inapplicability when both sides are affected, and the deformity which results.

5*th*. Carnochan's Method as practised by Rizzoli.—The difficulty in accomplishing the formation of a false-joint by simple division of the bone—the tendency to reunion being much greater than when a segment is removed.

Considering these objections I decided to operate upon my patient in the following manner: By division of the ramus of the jaw, about its middle, exsection of the condyle and division of the insertion of the temporal muscle, thus releasing the coronoid process and effecting its removal with the condyle—division of the masseter muscle at its points of origin—non-interference with the cicatricial band. By this plan I hoped to secure sufficient space for free movement of the remaining portion of the ramus, and I proposed to utilize the cicatricial band as a *quasi* ligament, and obtain movement of the bone between this band and the internal pterygoid muscle. By division of the masseter at its point of origin, I proposed to relieve the tension of this muscle and more effectually prevent union of the divided fibres.

CASE.—The patient consulted me in January of this year (1883), and gave the following history of her case: She is now twenty years of age. Eighteen years ago, when two years and a half old, and then residing on the banks of the Brazos River in Texas, she sustained a gunshot wound of the left superior maxilla, the charge, medium sized bird shot, entering just below the inferior margin of the orbit.

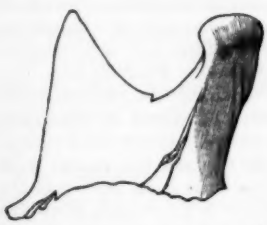
At the time of the receipt of the injury she was engaged in play on the porch of her dwelling, and the gun was discharged by a lad thirteen years of age, whose height compelled him to hold the weapon at an angle in taking direct aim at her head. This was done in play, the gun being presumed to be unloaded. The father, who was soon at her side, made efforts to check the hemorrhage which ensued, and sent immediately for the nearest physician, living some thirty-two miles distant. Late in the evening he arrived, "tired and cross," and declined to do anything, as he did not like to cause unnecessary pain, and as the child was sure to die. After a night's rest he returned home.

On examination it was found that the charge had entered just below the left orbit, comminuting the upper and fracturing the lower jaw as well, passed through the mouth and emerged below the left ear. The father in the hope of saving his child's life, continued his efforts to ward off fever and allay swelling by the administration of simple remedies, and the application of lint saturated in arnica. At the same time the mouth was forced open to cleanse it, but so great was the pain caused by the effort, that it was discontinued. The patient was unable to open the mouth for the purpose of taking nourishment, and finally all efforts were abandoned to effect the separation of the jaws, and soon they became firmly locked. At the expiration of a week following the accident, another physician was summoned, who removed some wadding, shot, and pieces of bone, and gave a very unfavourable prognosis as to the recovery of the child.

At the time of the accident the globe of the eye did not appear to be seriously injured, but the inflammation which attacked the parts and the cicatricial contraction which ensued in the closure of the wound, destroyed vision, and drew down the ball to such extent as to expose but a line of the iris, and produced a marked condition of ectropion. Soon the patient became accustomed to eat only soft food, which she learned to force between the teeth. The pressure exerted upon the teeth caused them to break, and the posterior teeth, which could not be erupted, became carious and gave pain.

A careful examination of the parts involved showed firm and complete occlusion of the jaws, absence of the two central and right lateral incisor teeth of the upper jaw, which had been worn away by the pressure made in rubbing pieces of food over them. Slight lateral movement could be obtained, showing absence of temporo-maxillary anchylosis. On passing the finger into the buccal cavity of the left side, a dense, rigid, cicatricial band could be felt extending from the molar region of the upper, to the molar region of the lower jaw. Eight to ten of the anterior teeth of the upper and lower jaws had fully erupted; the remaining were imbedded in the alveoli of the jaws, the edges of the crowns being seen in some instances. Just below the border of the orbit, on the left side, occupying the position of the upper portion of the canine fossa, there was a deep sulcus, lined by integument which had been drawn into it, and with it the lower eyelid; complete eversion of the lid having been produced, and the lower segment of the globe being constantly uncovered. This sulcus was caused by the entrance of the charge of shot. There was marked flattening of the entire left side of the face produced by the injury inflicted upon the structures, and the absence of subsequent full development. On the left side of the neck, on the upper portion, a few shot could be felt lying beneath the integument, and one was also felt beneath the mucous membrane overlying the left side of the lower jaw. Articulation was somewhat impaired.

On the 26th of January, 1883, I operated upon the patient in the manner above indicated, and with a view of relieving, by the one operation, the condition of ectropion. To accomplish this, I began the incision to the nasal side of the sulcus, carried the knife through it, and continued the incision along the lower border of the zygomatic arch to the tubercle at its base. I then dissected up the tissues from the bottom of the sulcus, and also from the anterior portion of the floor of the orbit, in order to release them completely, and thus replace the lower lid. Owing to the contraction which had ensued it was found necessary to divide this flap of tissue transversely, bring it into proper position, and secure the edges by a hare-lip pin. Continuing the dissection, I divided the fibres of the masseter muscle separating the entire origin, and then depressed it with the superjacent structures, thus very easily and completely exposing the coronoid process, the articulation and outer surface of the ramus to one-half its extent. With strong bone forceps I divided the ramus, severed the ligaments of the articulation with the probe-pointed bistoury, then twisted out the articular head, and finally detached the insertion of the temporal muscle, removing the piece of the ramus which I exhibit.



Efforts were now made with wedges of wood to separate the jaws, but without success. On passing a probe between the jaws I found a strong osseous band which firmly united them; this I divided with the Adams saw, passing it between the imperfectly erupted teeth, and sawing from before backward. The wedges were again used, and the jaws separated to the extent of one inch between the processes at the position of the incisor teeth. The divided portions of the osseous band were then cut away with pliers and knife, and found to consist of a thin plate of bone.

On recovery from ether, the patient found no difficulty in opening the mouth, although it was accompanied by slight pain. In a few days the pain disappeared, and the mouth could be readily opened. Within three weeks after the operation twenty-one roots and partially erupted teeth were extracted, so as to fit the processes for the adaptation of artificial dentures. The incision was closed by four interrupted silver sutures, and dressed with lint saturated with carbolized oil. In order to assist in the exercise of separating the jaws, I employed daily for two weeks a mouth gag, which I devised some years since, and which works with a strong screw. In using it the patient complained of pain on the sound side, the structures of which had become somewhat rigid owing to long disuse.

At this time the patient is wearing a set of artificial dentures, which are retained readily in place, and which serve the purpose of mastication excellently well. The ectropion is relieved so that the globe is covered by the eyelids. Articulation is much improved. No tendency to recontraction is observed. On the contrary, the patient states that her ability to open the mouth increases each day, and that she can separate the jaws to a greater extent than was done at the operation and without pain. Exact measurement gives the distance between jaws, when separated, as one and a half inches at the position of the incisor teeth.

Whilst in the present case the incision was made so as to relieve the ectropion as well as to uncover the joint and ramus, I should modify it but slightly in other instances, as it so completely exposes the parts, and does not involve either large branches of the facial artery or nerve, thus avoiding excessive hemorrhage or subsequent facial paralysis. It should begin at the middle of the lower border of the malar bone, and be carried outward in contact with this border and the inferior border of the zygomatic arch, to a point over the tubercle at its base; it is desirable to keep near the border of the zygoma in order to avoid wounding the duct of Steno, which lies a finger's breadth below.

So far as I am aware, the plan of operation suggested and practised is novel, in the fact that it includes removal of both coronoid and condyloid processes with the upper half of the ramus, as well as division of the masseter, external pterygoid, and temporal muscles, at the point of origin of the former, and the insertion of the latter. The advantages claimed over other methods are:—

First. Its application to all forms of permanent closure, that due to temporo-maxillary anchylosis, as well as to cicatricial formations.

Second. The utilization of the entire body of the jaw in opening the mouth, not only affording in this way greater advantage in mastication and articulation, but serving to prevent deformity.

Third. The formation of a more perfect artificial joint in the removal of both processes, thus overcoming the resistance of the more or less fixed upper segment, when the joint is made either in the body or the ramus of the bone.

ARTICLE X.

REPORT OF A CASE OF ABSCESS OF THE LEFT ILIAC FOSSA, WITH SOME REMARKS. By LOUIS W. ATLEE, M.D., of Philadelphia.

THIS case is reported because it shows throughout its whole course the distinguishing and characteristic features of a phlegmon of the iliac fossa, together with some very rarely observed occurrences.

Mrs. H., æt. thirty-five years, native of Ireland; has been twelve years in America. Her father died of an acute disease of the lung (was perfectly well, when he took a bad cold and died in two days). Her mother died of consumption. Mrs. H. is of medium height, sufficiently well nourished, and of dark complexion; has been married two years, and has previously enjoyed good health. The husband is a robust labouring man.

On the 10th of March, Mrs. H. gave birth to a well-developed male child, still-born, after a labour of thirty-six hours. The physician attending used some force, but no instruments, in dragging the child away. She did not call it a hard labour.

The lochia stopped on the second day. Her breasts did not get hard or show any signs of containing milk; the nurse rubbed them with camphor and lard.

She did perfectly well for the nine days following delivery, getting up on the ninth day.

On the evening of the tenth day, after supper, which she had cooked herself, "a burning pain came into her hench;" it was in the left side, deep in the pelvis.

She was not too sick to be about on her feet, the pain at that time being in no way influenced by position, feeling always the same. In defecating or urinating, she had not the slightest trouble. There was no nausea or vomiting; she could eat, though she had no appetite.

Eighteen days after the pain began, a swelling appeared in the pelvis on the left side. This swelling reached as high as the crest of the ilium, but it did not extend near to the median line. After the appearance of this lump, the pain became frightful; the slightest motion or jar was agony; she could neither eat, drink, nor sleep, so that at the end of two weeks her condition was such that her life was despaired of. Through all this she was attended by a physician who looked upon the case as one of rheumatic affection of the hip-joint.

When my father first saw this patient, on the 23d of April, in consultation with the attending physician, her condition was considered to be an almost hopeless one. At that time, owing to inability to keep any but the one position upon her back, there was a bed-sore over the region of the sacrum as large as the palm of the hand. The thigh was flexed on the pelvis. To make life at all supportable, a quarter-grain of morphia was being given every two hours. Owing to the position of the patient, it was exceedingly difficult to examine her sufficiently to establish the diagnosis, but after considering carefully the history of the case as well as the local and general symptoms then manifesting themselves, a large tumefaction, with redness of the skin, in the left gluteal region was believed to be owing to a collection of pus that had found its way through the ischiatic notch out of the pelvis. A knife was introduced some three inches before the matter was reached. The quantity that came out was very great, but could not be measured, for the patient's position was such that it was impossible to collect it. For one week nothing was done but to endeavour to keep up the strength of the patient, and prevent her from dying. At that time, the pus seeming not to flow so freely as it had done at first, a drainage-tube was pushed some eight inches into the orifice.

When I first saw this patient, on the 3d of May, the lump in the left iliac region was barely perceptible; pus was being very freely discharged through the tube, and by pressure on the left gluteal region pus mixed with air gushed out.

Two weeks after the introduction of the tube, and while the pus was still flowing freely, she complained of soreness at a spot in the linea alba, midway between the pubes and umbilicus. A lump began to make its appearance there, which in two weeks was as large as an orange; it felt like an omentocele, and could be all reduced into the abdomen through a hole in the linea alba that could admit the tips of three fingers. When on her side, the lump became larger, fuller, and more tense; when on her back, it was much smaller. My father looked at it and said it was a hernia. Nothing was done to it beyond continual poulticing, when nine days after its appearance, and while the woman was making some exertion,

it burst, giving exit to at least a pint of pus. The opening closed in a few days, the lump having entirely disappeared.

Seven weeks after the opening had been made in the hip, the fistula there had entirely healed. During this time she had hectic fever, which only ceased when the fistula closed. On one occasion (the 10th of May) she had three congestive chills, during which her lips were blue, and she shook as patients do only in the most malignant paludal fevers.

So long continued a suppuration brought about such a profound alteration of the functions of digestion and innervation that we almost despaired of re-establishing them.

During this long ordeal she was given iron, quinine, and morphia, any food she could eat, and malt liquors.

I saw this patient again on the 25th of June; she was very much stronger, being able to leave her bed. She ate well, but still had some pain, to relieve which a friend advised her to use laudanum (25 ♏).

On the 26th of June, while lying quietly in bed, she felt a most importunate desire to go to stool, and before she could get up, a great quantity of pus came from the bowel. After this she felt very much relieved. Notwithstanding the presence of this large quantity of pus in the pelvis, she had no hectic, a good appetite, and was rapidly gaining strength. At this time the bedsore was nearly healed, but there was a hole in it that discharged greatly. This hole seemed to communicate with the interior of the pelvis, the pus coming from the same abscess that had burst into the rectum, much less pus coming through at the bedsore after the discharge from the rectum took place.

On the 29th of July they wrote me as follows: "I wish to let you know that sister Mary is getting better; her sores are nearly healed up, she is gaining strength, she takes no medicine at all, but she says that her hip feels stiff and heavy."

Previous to the publication by Grisolle, in 1839, of his monograph on "*Les tumeurs phlegmoneuses des fosses iliaques*,"[1] the various inflammations liable to give rise to collections of pus in the pelvis were much confounded. In this monograph, which is by far the best yet given to us on inflammations of the cellular tissue or phlegmons in the iliac fossa, he proves them to be independent of the pelvic serous membrane in their origin, and generally also in their course. When Bernutz and Goupil published their joint observations on pelvi-peritonitis, it was made clear that peri-uterine peritonitis may and does occur without any disease of the cellular tissue between the uterus and its serous membrane. The very existence of this membrane is denied.

The collections of pus that may arise from phlegmon of the iliac fossæ have been anatomically divided into two varieties, subperitoneal and subaponeurotic.

In the first variety, the phlegmon develops between the serous membrane and the fascia iliaca; in the second, the inflammation is to be found between the fascia iliaca and the anterior surface of the iliac muscle.

In the subperitoneal variety, the pus is rarely circumscribed, but is

[1] Archives Générales, etc., tome iv. p. 34, etc.

often much extended, the pus burrowing to a greater or less distance. When on the left side it has been known to burrow along the serous membrane lining the sigmoid flexure of the colon and the upper part of the rectum, arriving thus in the true pelvis; or, it may go upwards and reach the region of the kidney.

In the subaponeurotic variety, the pus occupies generally the internal iliac fossa; it is limited in front by the fascia iliaca, behind, by the iliacus muscle. The pus generally burrows to the front of the thigh in passing between the fibrous band that is placed outside the sheath of the femoral vessels and the anterior superior spine of the ilium.

The iliacus muscle is sometimes destroyed, the pus reaching the periosteum of the iliac bone; the psoas is also implicated, more especially its internal border. In the same way the quadratus may be destroyed. The fascia iliaca has entirely disappeared, or contracted very close adhesions with the peritoneum.

The iliac vessels and nerves bathed in the pus are softened, and if indurated spots exist, are compressed.

The migrations of the pus are sometimes very curious. Bérard cites a case of a woman who died of pelvic abscess following labour; he found a vast collection of pus at the posterior and superior part of the left flank; it had extended itself outside of the peritoneum, between the iliac fossa and the intestine, had passed into the right iliac fossa by separating the peritoneum in the hypogastric region; it ascended from thence along the median line to the umbilicus, and there found its way out.

The exit the pus will make depends greatly upon whether it came from a phlegmon of the first or second variety.

In the first variety, it is most often seen in the lower part of the belly, a little above the crural arch.

In the second variety, the pus following and burrowing under the fascia iliaca will follow the sheath of the psoas and iliacus to arrive at the trochanter minor.

In either variety the abscess may evacuate itself by some of the viscera contained in the pelvis.

A case is mentioned in which the pus evacuated itself through the uterus. It was from an abscess of the left iliac fossa following child birth.

The pus following the fibrous sheath of the iliacus and psoas muscles has invaded the coxo-femoral joint, destroying the fibrous capsule, the head of the femur coming out of its cavity. This occurrence can be explained thus: As the pus follows the psoas and iliacus tendons, it may pierce their common synovial sheath, which communicates with that of the hip-joint.

The pus from these abscesses being found beneath the glutei muscles is anatomically thus easily explained by Jarjavay (*Anatomie Chirurgicale*, vol. ii. p. 615, F.). "Beneath the gluteus maximus and its deep fibrous sheath is a layer of cellular tissue, very loose, and more or less covered

with fat. It communicates, by the great sacro-sciatic notch, with the subperitoneal cellular tissue and that of the broad ligaments, and below with the same of the crural region. It results from this that a deep abscess of the buttock may spread to the upper part of the thigh, and that a phlegmon following ligature of the gluteal artery can extend into the pelvis."

In Velpeau and Bérard's *Manuel d'Anatomie Chirurgicale*, the same explanation is given.

These abscesses may terminate fatally by bursting into the peritoneal cavity.

The causes of these iliac phlegmons are very obscure. They are common after labour, more especially in primiparæ. Grisolle could not say that difficult labour, manual or instrumental interference had any effect in their production, but he supposes that it is more common in primiparæ than multiparæ, because they generally have longer labour. He states, particularly, that diffused phlegmon, vast suppurations of the pelvic cavity frequently follow much handling and unskilfully used forceps.

Velpeau saw a phlegmon of the left iliac fossa follow inflammation of that synovial capsule which covers the horizontal ramus of the pubis to facilitate the sliding of the psoas and iliacus muscles. The same professor saw a suppurating syphilitic bubo give rise to inflammation in the left iliac fossa by continuity of tissue.

Grisolle states very decidedly that "nothing would authorize writers to say as they do, that the annexes of the uterus, and, in particular, the broad ligaments, were the origin of iliac phlegmons following labour."

These phlegmons have been confounded with pelvi-peritonitis, and in their commencement with pelvic cellulitis. When the pus has extended itself about the pelvis the diagnosis from pelvic cellulitis is impossible as well as useless. When a pelvi-peritonitis is so mild as to give rise to symptoms analogous to those of iliac phlegmon, the swelling does not rise above the brim of the pelvis, nor does it reach to the iliac fossa, and it is clearly appreciable in one or more of the vaginal culs-de-sac. When distinguishable in the hypogastrium, which is a very rare occurrence, it is only at the last when the swelling has increased by successive attacks in the hypogastrium. Phlegmons are distinguishable from the beginning.

The tumour produced by pelvi-peritonitis does not give the resistance, elasticity, and hardness that we find in phlegmonous tumours, but gives a peculiar feeling of softness from the very beginning.

In phlegmon there is little fever or disturbance of the digestive functions in the beginning, whereas, in pelvi-peritonitis there is vomiting, hiccough, and high fever, etc.

In pelvi-peritonitis there is no retraction of the thigh.

Collections of stercoraceous matter in the bowel, and masses of intestine, united by false membranes, have been mistaken for an abscess of the iliac

fossa, but such mistakes are hardly possible to a competent practitioner of medicine.

These brief remarks are appended to the history of this case, because in no work in the English language, to our knowledge, are phlegmons of the iliac fossa distinguished as clearly as I believe they should be from other inflammatory affections in that region.

Article XI.

Clinical Observations upon Otorrhœa (Chronic Purulent Otitis Media) with Perforations of the Membrana Tympani.[1] By Read J. McKay, M.D., of Wilmington, Delaware, Member of the American Otological Society.

Having treated during the past eleven years 230 cases of otorrhœa, or, more technically, chronic otitis media with purulent discharge, I have concluded to present for consideration some clinical observations upon such cases with old perforations of the membrana tympani, and endeavour to show that they are not the unsatisfactory and irremediable class of aural diseases which they have long been regarded, and perhaps still are, by many general practitioners as well as the public generally.

And because of the well-known dangers from caries and necrosis of the temporal bones, meningitis, cerebral abscess, and purulent infection, which sooner or later may, and often do ensue, when they are disregarded or neglected, they should not in the future, as in the past, be permitted by physicians to pass from under their observation without any or carelessly directed local and medical treatment.

I shall carefully exclude from consideration at this time all cases of acute otitis media with recent perforations of the membrana tympani, which are the usual beginnings of the *chronic cases* I propose to analyze and present for consideration, as well as their later grave and dangerous sequelæ, of bone, meningeal, cerebral, or septic disease.

One hundred and seventy-six of the two hundred and thirty cases of otorrhœa (chronic purulent otitis media), about three-fourths of the entire number, were treated at the Out-door Department of Bellevue Hospital, New York City, during the five and a half years intervening between March, 1872, and August, 1877, and sufficiently full notes were not recorded of their exact condition and progress under treatment, to state definitely how long they were treated and with what results. All of them, I well

[1] Read before the Delaware State Medical Society, at its annual meeting held in Wilmington, Del., June 12, 1883.

remember, were more or less benefited, many of them I feel sure were improved, and a small unknown number permanently cured.

Recent examination of my private case-books shows that of the 54 recorded cases 25 have such full notes as to enable me to state quite definitely how long they were treated and the results of the treatment.

It was recorded that 24 of the 176 hospital cases had old perforations of the "drum membranes;" the remaining 152 cases had no recorded notes as to those common complications.

The 54 private cases recorded had 49 old perforations, and several others are supposed to have had, but they were neither noted nor counted.

The frequency of the perforations found in the more carefully recorded cases shows how commonly they occur with chronic purulent otitis media.

In 57 of the cases, perforation of the membrana tympani was found upon one side only.

In 14 of the cases, perforation existed upon both sides.

3 " 73 cases had 2 perforations in one drum membrane.

1 " " " 3 " " " " "

The usual local complications due to the irritating character of the purulent discharge, such as the various forms of inflammation of the external auditory canals, aural polypi, and polypoid granulations upon the "drum membrane," were not always noted, and will not especially engage our attention.

I shall present brief histories of the 25 fully recorded cases, so that we may learn their etiology, duration, condition, and the results of the treatment they received.

Case I.—In the spring of 1873, Mrs. S., aged 30, a resident of New Jersey, was treated for chronic purulent otitis media with old perforations of her drum-membranes, which she had had for years. Her hearing was impaired. She frequently experienced more or less discomfort and pain in and about her ears. She was carefully treated, and within two months' time the perforations were healed, her discomfort relieved, and hearing greatly improved, and these improvements continued more than five years thereafter, the last report received of her condition.

Case II.—In February, 1874, Thos. F., aged 32 years, native of England, an engineer, reported that at 12 years of age his left ear began to discharge. Two years afterwards a polypus was removed from it in a London Hospital, and for two years thereafter he had very little discharge. Then it gradually became more and more profuse from year to year. His hearing became so impaired he had to change his work from a boat to the care of a stationary engine. For the past five or six years he could not hear his watch when pressed against his left ear. With his right ear he could only hear his watch fifteen inches, and it had been discharging five or six months.

A large polypus was found filling the left meatus. It was removed by Wilde's snare, and its remaining adhering pedicle was removed by local caustic applications. Perforations were found in both drum-membranes. After five-and-a-half months' treatment, each ear could hear his watch three feet. The discharge had ceased some time previously, and the per-

forations had healed. In September, 1875, he reported his hearing remained very good, and that he had no discharge from his ears.

Case III.—October 2, 1878, J. W. L., a schoolboy, aged 18, stated his left ear had discharged more or less since he had the measles when four years of age. With it he could hear a watch pressed against the ear, and the loud voice. After cleansing the left ear by syringing with warm water and drying it with absorbent cotton, several extensive and old perforations and slight granulations of the drum membrane were found. About three months previously he got water in his right ear whilst sea-bathing, causing some deafness and tinnitus. It could hear the watch ten to eleven inches. No purulent discharge was found in it but a recently formed perforation of the "drum membrane," which healed in four days' treatment and gave no further trouble. Within four months the perforations and granulations of the left ear healed, and remained so several years after, the last report from him. His hearing, which had been promptly improved, had continued very satisfactory, and had caused him little or no annoyance.

Case IV.—April 5, 1879, B. H., a boy aged 7 years, was first examined. His mother stated that his right ear began to discharge when he was six months old, and had done so from time to time since. That it was always more profuse when he had a cold, from which he was rarely free. He had naso-pharyngeal catarrh verging upon ozæna. At night he has been suffering with earache of his left ear, due to subacute aural catarrh. From his right ear there is a profuse purulent discharge. After cleansing it a large perforation of the drum-membrane at and below its centre, one-third of the size of the membrane, was found. His general health was greatly impaired, and received prompt attention as well as his ears. The left ear promptly improved, and the right rather slowly but satisfactorily. The discharge ceased in a few weeks, and the hole in the drum-membrane diminished more than one-half of its size. He was not treated so often as desired because of his unusual timidity, and during the summer he was absent from home, but no discharge was observed. When he returned in the early autumn the perforation was still smaller, and it subsequently healed. During the winter cold-taking caused it to reopen, but it again healed after a few weeks' treatment. For more than three years past he has not experienced any annoyance from his ears.

Case V.—September 20, 1878, Sarah W., a school-girl aged 15 years, was examined, and aural polypi were found nearly filling her left meatus. They were destroyed by a few applications of chromic acid and a large central perforation of the drum-membrane was revealed. It rapidly diminished in size under treatment, but never entirely closed whilst under observation, a period of four months, because of irregularity of visits for treatment and neglecting daily directions at home to try to remove the discharge.

Case VI.—September 26, 1879, C. J., aged 38 years, reported that when a child he had scarlet fever, which affected both of his ears. They have discharged more or less ever since—the right ear a purulent, and the left one a serous, exudation for years past. The hearing of the right ear was so very much impaired that he relied upon the left one almost entirely, and with it he did not hear well. He "never had pain in his ears." Examination manifested that the right drum-membrane had disappeared except a very narrow rim of its marginal attachment, which was broadest at its upper edge, and there existed a large central perforation of the left

membrane. Under treatment the latter diminished to one-half of its size in a few months, and has remained so. The right drum-membrane began to re-form by growing from its entire margin, and in June, 1880, a thinly prepared and moistened cotton artificial drum-membrane was first introduced to cover the perforation, and it has been worn ever since. It immediately improved his hearing. It requires to be renewed once a week or oftener, which he has learned to do for himself. The right drum membrane has almost entirely re-formed, and now only a narrow, central, vertical-shaped opening exists. The hearing of his right ear has greatly improved for all kinds of sounds, both with and without the artificial "drum," and he does not now use it constantly. For a year past he has worn the same kind of cotton artificial drum membrane in his left ear also, with considerable benefit to its hearing. The improvement in his condition gives him great satisfaction and comfort. If he experiences any irritation in his ears from cold-taking or from wearing the artificial "drums" too long, which cause a purulent discharge, they are removed, and the use of finely powdered boracic acid at night promptly checks its formation. The "drums" are worn the next day.

Case VII.—October 4, 1879, S. B., a little girl aged four years, was first examined. She had a profuse and offensive otorrhœal discharge from her right meatus which had existed nine months. Almost her entire right drum-membrane was destroyed. Her hearing was impaired. She had inflammation of the left external auditory canal and chronic aural catarrh of same ear. She had chronic naso-pharyngeal catarrh. The discharge was soon checked and the large perforation began to diminish, but it did not close entirely. Her hearing and general condition were decidedly improved in a few months, and remained so for a year or longer, when she relapsed from cold-taking. In less than a week she was again relieved. During the past winter she had a similar experience. Again, about a month ago, she relapsed during an attack of measles, and the discharge was relieved by one visit and within a week. The perforation is still unhealed.

Case VIII.—Frank P., an orphan, between 3 and 4 years of age, an inmate of the "Home for Friendless Children" of this city, was deaf and dumb when admitted. Could not learn his early history. My attention was called to his "running ears," which had existed previous to and since his admission to the "Home."

October 15, 1879, his ears were cleaned and examined carefully. Three perforations were found in his right drum-membrane and a large one in the left, which had destroyed two-thirds of its lower anterior portion. He did not seem to hear or notice any external noise, but smiled and gave evidences of perceiving the musical sound of a vibrating tuning-fork placed upon his forehead, which indicated that his auditory nerves and internal ears were probably not diseased and did not cause or complicate his deafness. He did not speak at all. When at play with other children would very rarely make an indescribable noise. He had chronic naso-pharyngeal catarrh. After a few weeks' treatment he began to hear and to talk in monosyllables, and later to yell and to sing, which he now does the same as his playmates. The perforations of the right membrane healed one at a time during two years under caustic treatment, but reopened several times "when he took cold." For the past year and a half, under the boracic acid treatment, they have remained permanently healed notwithstanding cold-taking. The large hole of the left drum-membrane has grown gradu-

ally smaller under similar treatment. It is now a narrow vertical opening which promises to close soon, judging from the progress it has made in healing during the last nine months.

Case IX.—M. W. B., a young man 18 years old, was referred to me by Dr. Bush, in June, 1880. He reported that six or seven years previously he had measles which affected his ears, causing a great deal of pain for a long time, but none the past three or four years. That he had had a discharge from his right ear for more than four years, and it had become very offensive during the past three months. For nine months he had been greatly annoyed by a dry, painful naso-pharyngeal catarrh. He was debilitated, and apprehended pulmonary disease. With his right ear he could hear a watch one inch, with the left ear three and a half inches. Required to be spoken to in a loud voice to hear distinctly. He had chronic aural catarrh of his left ear. Small polypi were found in his right meatus attached to its walls and within the tympanic cavity. They were removed with Blake's aural snare and the remnants touched with chromic acid. Two perforations were found in the right drum-membrane. Within two months his hearing was greatly improved, the polypi removed, and the perforations healed. His naso-pharyngeal catarrh was also much benefited. In the fall of 1882, two years after treatment, his mother reported that his ears had remained continuously well, and he had greatly improved in his general health.

Case X.—September 25, 1880, R. P. B., a school-boy, aged 13 years, was brought for examination of his right ear, which was discharging profusely. When two years of age, he had measles, and his right ear discharged for one-and-a-half year thereafter continuously, and then only at intervals. Three years ago it returned. One year ago it discharged blood, and again one week ago. Hearing of both ears was impaired. The left one less so, and it is due to chronic aural catarrh. The right drum membrane was found to have two large oval perforations in it, situated before and behind the long handle of the malleus attachment. The discharge was considerably checked in a few weeks, and the perforations began to heal all around their margins, and after six months' treatment they were only one-half of their former size. His hearing had improved somewhat. The discharge did not recur for some months, until after taking cold. In December, 1881, the dry boracic acid treatment promptly checked the discharge, and the perforations began to diminish again. n the fall of 1882 his mother was instructed how to introduce the cotton artificial "drum," to be renewed once a week or oftener. Its use greatly improved the hearing of his right ear when covering the perforations. He still continues to wear it with much improvement of his hearing. The perforations were about one-third of their original size a few months ago.

Case XI.—J. E., a tobacconist, aged 46, was first examined March 24, 1881. He stated he had had trouble with his ears since boyhood, and they were usually worse in March. His hearing was impaired, and he often had pain in his ears. After removing impacted wax and epithelium it was found he had inflammation of the external auditory canals, and old perforations of his drum-membranes. After three weeks' treatment they healed, and his condition was greatly improved in every way. About eighteen months afterwards he had a slight relapse of soreness and deafness, and was relieved by one visit in which his ears were cleansed and powdered boracic acid was used.

Case XII.—A. L., a boy, aged 7 years, was first examined July 2, 1881. He had scarlet fever one-and-a-half year previously, since which time his left ear has discharged more or less. His hearing was somewhat impaired. Granulations were found upon his left drum membrane, and one perforation of it larger than one-eighth of an inch in diameter. The former disappeared after a few weeks treatment, and within three months the perforation healed. His hearing was decidedly improved. He had a slight relapse of otorrhœal discharge from "cold-taking" in the fall of 1882, which a few days' use of powdered boracic acid checked, and soon re-established a healthy condition of his ear.

Case XIII.—F. J. B., a farmer, aged 30 years, reported, October 3, 1881, that before he was six years old he had scarlet fever, which affected his ears, causing deafness, pain, and discharge. For several years past he has experienced periods of getting better and worse, which were very annoying. He has chronic naso-pharyngeal catarrh, and takes cold often and easily, which always dulls his hearing. He has chronic aural catarrh of his right ear, and small aural polypi with perforation of membranum tympanum of his left ear. He was considerably improved by a few treatments, of several weeks' interval, the polypoid granulations removed, and the perforations healed within two months. He had slight relapses in the spring and fall of 1882, which were promptly relieved by one visit each time. He received directions about local and constitutional treatment to be employed at his home.

Case XIV.—J. L., a young woman of 19½ years, reported, October 22, 1881, that she had scarlet fever seven years ago, which affected her ears. One year ago she became somewhat deaf. The last month it has grown worse, and she is greatly annoyed by tinnitus aurium. She had chronic aural catarrh of her left ear, and an old perforation of the right drum membrane. Her hearing was greatly improved at once, and in a few weeks the perforation was healed. She remained so months afterwards, the last heard from her.

Case XV.—Miss S. S., aged 20 years, reported, October 29, 1881, that ten years previously she had ear trouble with the measles. That the right ear pained and discharged at irregular intervals for four years afterwards. She has nasal catarrh, and periods of deafness, lasting a few weeks, usually whenever she takes cold, which occurs irregularly several times a year.

Examination revealed chronic aural catarrh of left ear, and otorrhœa of right, with perforation of its drum membrane. Three visits to the office to receive treatment greatly benefited her in every way, and in less than a month, her ears were well, and remained so more than a year afterwards, I was informed.

Case XVI.—December 12, 1881, M. C., an unmarried woman, aged 28 years, reported that she had been deaf 9 or 10 years, and lately she had had considerable tinnitus. Her hearing was very much impaired. She has chronic aural catarrh of her right ear, its drum membrane very markedly opaque, thickened, and sunken. Her left ear contained purulent discharge, and a large perforation of its drum membrane was found, only a narrow rim of its margin remaining. Granulations covered the inner tympanic wall. She had chronic naso-pharyngeal catarrh and hypertrophied tonsils. Her hearing was slightly improved at once. Three weeks' treatment greatly improved her condition in every way, checked the discharge, healed the granulations, diminished the size of the perforation,

and decidedly increased her hearing. About a week ago I was informed her relief had continued permanent and very satisfactory.

Case XVII.—Miss G. C. H., aged 12 years, reported, July 12, 1882, that her right ear has been affected more or less since she had scarlet fever when five years old. The ear discharges and is often painful. She catches cold often and easily, which usually decreases her hearing. Removed an excess of dry wax from both ears, and found a perforation of the left drum membrane, and granulations upon the right membrane. Within five weeks her ears were well, her hearing satisfactorily restored, and no relapse has been reported.

Case XVIII.—G. M. S., a school-boy, aged 14½ years, was first examined July 13, 1882. His deafness makes it difficult for him to attend school. His ear trouble began two years ago. His mother thinks it is due to excessive bathing and diving. He has considerable earache. Both ears discharge, alternately and together. The left one now doing so. The right one was found occluded with epithelium and wax. Both drum membranes were perforated, the hole in the right one much the larger, and more than half of its membrane had disappeared. His hearing was promptly improved, and the discharge checked in a few days. Within four weeks the perforations were considerably diminished. The smaller one of the left ear subsequently closed, the larger one of the right did not entirely. For eight months past he has not had sufficient discomfort to seek further advice.

Case XIX.—Miss T., aged 17 years, reported August 29, 1882, that seven or eight years previously she had scarlet fever, and her ears were affected. During the last two or three years her left ear has discharged pus profusely and occasionally blood, and it has pained her more or less. Her hearing is considerably impaired. Examination detected chronic aural catarrh of her right ear, and aural polypi nearly filling the left meatus, which was partially removed with Blake's aural snare. Boracic acid was packed in the ear and within ten days the polypi had completely disappeared. Then a perforation of the drum membrane was found, which healed within two weeks under the same treatment, and remained so two months longer when she was last examined. Her improved hearing was satisfactorily maintained, and she had no relapse up to two months ago.

Case XX.—R. H., a school-boy, 17 years of age, reported September 24, 1882, that about four years ago he had scarlet fever which affected his ears, causing them to discharge, and they have continued to do so more or less from time to time ever since. He has considerable dulness of hearing. Hears best with his left ear. The right one rumbles and has bled twice. Examination detected several large polypi filling the right meatus. They were removed with Blake's aural snare, and found attached within the tympanic cavity. Chromic acid was applied to the undetached roots of the pedicles. A large perforation, which had destroyed the lower two-thirds of drum membrane, was observed. A smaller perforation of the left drum membrane was found. Boracic acid was packed in both ears. The discharge soon ceased. He improved rapidly in hearing, the holes diminished in size, especially the longer one, and he experienced marked relief within three months. He was treated several times a week for two months, then once a week about same length of time, and afterwards once a month a few times. He had two relapses of otorrhœal discharge from cold-taking, which were relieved by one or two treatments. He continues comfortable and greatly improved.

Case XXI.—J. L. P., a school-boy, aged 18 years, was brought to my office, Nov. 11, 1882, for examination. He has had chronic naso-pharyngeal catarrh for some years past, greatly obstructing his nasal breathing, and his ears have (within the last few years several times a year) been affected with deafness, occasional earache, and slight discharge. Found subacute aural catarrh of his right ear, and eczema of external auditory canal of his left ear, with a small perforation of its drum membrane. His hearing was promptly improved and maintained by successive treatments. The discharge was checked within two days, and the perforation healed within a week. His nasal catarrh slowly but steadily improved under compressed air, atomized fluid applications, and internal medication. He has had several slight relapses from cold-taking. His condition has been greatly improved in every way.

Case XXII.—O. P. B., a young man of 19 years, reported December 28, 1882; he had had "running ears" when a baby, and occasionally since. He has earache often. Has been more or less deaf for some years, which increased last summer after sea-bathing. Examination revealed chronic naso-pharyngeal catarrh, and chronic aural catarrh of both ears, with slight discharge in the left one and a small perforation of its drum membrane, which healed in a few days. His condition was somewhat improved in two weeks, which was all the time he could be treated, and I have been informed it has continued.

Case XXIII.—E. B., a boy of 13 years, presented himself February 24, 1883. His ears began to run five years previously. First one discharged and then the other, and it always increased when he had a cold, which occurred frequently. Never has any pain about his ears. His hearing was very defective, requiring to be spoken to in a loud voice generally, and it is worse when he has a cold. After cleansing his ears large central perforations of both drum membranes were detected with polypoid granulations upon the membranes, and attached also to the deep portions of the external auditory canals. Powdered boracic acid was packed in both ears, filling the meati. It was to be used at home as soon as the discharge was manifest again. Four days later, his second visit, the discharge had ceased and the holes were healing. Politzer's method of inflation greatly improved his hearing. The case progressed favourably and rapidly. Within two weeks all granulation tissue had disappeared. The perforations were healed to the size of pin-points at his last visit, seven weeks from beginning of treatment period. He has not reported since, which he promised to do if any further trouble was experienced.

Case XXIV.—Miss B., aged 19 years, reported March 20, 1883, that her ears discharged for a time in infancy and again ten years ago, when she had scarlet fever; also they have continued to do so more or less ever since, either alternately or simultaneously, and they are worse when she catches cold, which she often does. She has considerable tinnitus and dulness of hearing. Has chronic nasal catarrh, which annoys her very much and prevents her sleeping well. Examination manifested large perforations of both drum membranes of unequal size, with granulation tissue upon them. Packed boracic acid checked all discharge in a few days, destroyed the granulations, and the holes began to diminish in size. Her hearing was promptly benefited, and it has become much better. The smallest perforation closed within four weeks, the larger one has not closed. Her nasal catarrh has nearly disappeared, and she sleeps better than she has for years past. In eight weeks she has been greatly benefited in every way, and it promises to continue.

Case XXV.—Miss C., aged 16 years, reported March 21, 1883, that between five and six years of age she had whooping-cough, and shortly after her ears "gathered and run," which has continued more or less ever since. They are worse in the winter when she catches cold. They often pain. Her hearing is considerably impaired. Has chronic nasal catarrh. Examination detected perforation of both drum membranes with granulations upon membranes. Packed boracic acid in her ears, which checked the discharge within three days; the granulations began to disappear and the perforations to diminish in size. Her hearing was quickly somewhat improved, and it has continued to grow better. She progressed favourably and rapidly, notwithstanding a slight relapse from cold-taking. In eight weeks all granulations had disappeared and the perforations were closed. She was recently under observation for examination.

A short recapitulation of the results and methods of treatment will, I think, be interesting and striking.

In 17 of the 25 cases fully reported, the perforations of the drum membranes were healed, viz: Nos. 1, 2, 3, 4, 9, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, and 25.

In 4 other cases in which perforations existed in both ears, viz: Nos. 8, 18, 20, and 24, they were healed in one ear and were not in the other.

In the remaining 4 cases, viz: Nos. 5, 6, 7, and 10, they were not healed, but the discharge was checked, the perforations diminished in size, and their hearing was greatly improved; in fact, their condition was in various ways more or less ameliorated and rendered much more comfortable.

The first 15 cases were treated by various caustic applications, and they required usually several months' treatment to relieve or cure them.

The remaining 10 cases were treated with finely powdered boracic acid packed in their ears, usually filling the meati the first few visits, which generally checked the purulent discharge in a few days, and only required several weeks (usually about four) to relieve or cure them.

The latter treatment (known as the dry method), besides its great saving of time, is painless, and the only objection patients make to its use is, that it renders them more deaf for a few hours immediately after its introduction. But as it is only for the first few applications (until the discharge is checked), they submit after explanations that it will be merely a temporary inconvenience.

The 25 cases were selected to be reported because full notes were made of them from the beginning to the end of their treatment.

The remaining 29 cases of the 54 private cases were omitted because pressure of business prevented full notes being made of their progress under treatment, and I feel confident that their average of relief or cure compares very favourably with those detailed.

ARTICLE XII.

A MODIFIED PORRO-CÆSAREAN OPERATION: THE PEDICLE DROPPED IN.

By PAUL GROSSMANN, M.D., of Omaha, Nebraska.

ON Sunday, May 7, 1882, I was called to attend, in her first labour at term, Mrs. Louise Cuneo, a rachitic dwarf, 23 years of age, and measuring four feet one inch in height. The waters had broken before her pains began, and at my visit, her pulse was 72, and temperature 98½°. I was informed that the patient was one of eight or nine children, born of sound, healthy German parents, whose four sons were well built, whilst all their daughters were like this one, rachitic.

I found, upon examination, that the arms of the patient were short, and presented the usual rachitic appearances. Her right lower extremity was of the shape of a long S, and the patella looked outward, notwithstanding which, the leg could be placed at nearly a right angle with the thigh, and the foot, in standing, rested with its plantar surface upon the floor. The left leg was not so much deformed, and both tibiæ presented the evidences of disease, in the fact that there was a convexity of these bones in their lower third.

On examination of the pelvis, it was found to be asymmetrical, and contracted in all its diameters, but chiefly antero-posteriorly. The lower conjugate, or the *conjugata diagonalis*, was found to measure about three inches; deducting ¾ of an inch, would leave the antero-posterior diameter of the superior strait at 2¼ inches. The lumbar vertebræ were found to retreat very abruptly from the promontory of the sacrum. The coccyx projected forward in the characteristic hook form often seen in rachitic women. The os was undilated.

During Monday, the pains were rather strong, and the patient was given occasional doses of opium. Monday night they became still stronger, and ¼ of a grain of morphia was given hypodermically, and two more doses of ¼ of a grain each by the mouth at 1 and 7 A. M. Tuesday. At this time there was only sufficient dilatation of the os to admit the tips of two fingers. During Monday the patient's pulse was about 100. On Tuesday it gradually increased, till it had reached 144 at 10 P. M. The waters had entirely drained away by Tuesday morning.

On Monday and Tuesday the question of forcible delivery had been presented to the family, and they were informed as to the operations of craniotomy, Cæsarean section, and the Porro operation. They delayed their decision, but finally consented to the performance of craniotomy, refusing to allow her to be removed to the hospital, or any other more convenient place. In order to secure better dilatation of the os, at 4 P. M. Tuesday, the patient was given ten grains of hydrate of chloral, and three of quinia, and this dose was repeated every thirty minutes for three doses, and every hour for three more.

At 10 P. M., after the long delay, it was seen that the patient's strength was declining, and it was deemed essential to operate at once. Much valuable time had been lost in an effort to secure permission for the performance of abdominal section, which was persistently denied; finally, I under protest undertook to perform craniotomy. The os was now found more dilated and easily dilatable with the fingers. The child was still living and found to be in the first position of the vertex. I applied the

craniotome to the right parietal bone, and found no trouble in perforating it. As much as possible of the brain substance was removed with the aid of an elastic catheter, and parts also of the frontal, parietal, and occipital bones. I then attempted podalic version with the right hand, passed in on the left side of the pelvis; my hand was passed through the pelvis with great difficulty, and when forced far enough to engage the upper third of the forearm in the pelvis, it was compressed so tightly that it was impossible to flex the fingers; the hand reached the child's right knee, but I was unable to grasp it, or go further, and the combined pressure of the narrow pelvis and the uterine contractions were unbearable and required the instant removal of the arm. After a few moments' rest, I made another attempt at version with the left hand, passed in on the right side of the pelvis. On account of the asymmetrical character of the pelvis, this was found still more difficult, and the hand could not be inserted as far as the knee. Two more attempts were made with the right hand, and one more with the left, but it was impossible to grasp the child's knee, or reach its foot.

The uterine contractions were now so violent that rupture of the uterus was imminent; the patient had been profoundly anæsthetized for nearly five hours; meanwhile, subjected to craniotomy; and I felt that it was useless to prolong the attempt at embryotomy, and, after a brief consultation with other physicians present, I decided to insist upon abdominal section as the only possible means of saving the mother, and to perform the Porro operation, so that, if the patient lived, future impregnation would be impossible. She had then been in labour sixty-six hours, and her pulse ran from 140 to 144 per minute.

The family now yielded to my demand, and I made an incision from two inches above the umbilicus, almost to the symphysis pubis; the opening of the abdominal cavity was made without difficulty, or the necessity of applying a single ligature. The small intestines and the omentum protruded and were replaced.

I made an incision eight inches long in the uterus; seized the legs of the child, a good-sized boy, and removed it; fortunately, the placenta was attached to the posterior uterine wall. The uterus was then lifted out of the abdominal cavity, and eight ligatures were applied in the right broad ligament; a curved needle armed with a double silk ligature was passed through segment after segment of the ligament and each one tied as soon as passed. An incision was then made from the long incision in the uterus, but at right angles to it, almost to the ligatures across the broad ligament, and one-half the uterus just above the internal os was separated by scissors from the part beneath; six ligatures were similarly inserted in the left broad ligament; another right-angle incision was made nearly to these ligatures, and by means of the scissors the complete removal of the uterus above the internal os was made.

The uterus, Fallopian tubes, and ovaries were then removed. An exceedingly small quantity of blood was lost during the operation.

Six sutures were then inserted in the uterine stump, and a perforated elastic catheter was inserted through the abdominal wound, stump, and vagina for drainage. The ends of the ligatures were cut off, the stump returned to the cavity, and this thoroughly sponged out. The operation was performed without spray, or other antiseptic preparation.

An examination of the pelvis showed that the antero-posterior diameter of the superior strait was only two inches, and the pelvis very asymmetrical.

The abdominal incision was then closed by ten ligatures, with careful approximation of the peritoneal surfaces. The wound was dressed with lint moistened with carbolized oil, and the patient bandaged and removed to her bed; she now became conscious and asked for her child. She was given some stimulant and a hypodermic injection of morphia; she conversed a little and fell asleep. Her pulse at the conclusion of the operation was 128, but as soon as she emerged from the anæsthesia it began to intermit, losing every tenth beat, for an hour and a half.

At 6 A. M., her pulse was 128, and respiration 28. At 8 A. M., her pulse and respiration were the same. During the day she was given nourishment and stimulants which she retained, and was kept under the influence of morphia. At noon her urine was withdrawn by catheter, and some tympanites was discovered. More morphia was given at this hour, and the patient expressed herself as feeling better and hungry. At noon her pulse was 132, respiration 24, temperature 98½°. At 5 P. M., delirium was present, the tympanites more marked, and the pulse was fluttering; stimulants were now pushed. At 7.45 P. M. she was pulseless, and fifteen minutes after this, died—fourteen hours after the operation.

I feel confident that the above operation would have been a successful one if performed at the very beginning of labour.

ARTICLE XIII.

EXPERIMENTS IN THE USE OF NAPHTOL FOR THE TREATMENT OF SKIN DISEASES. By ARTHUR VAN HARLINGEN, M.D., Professor of Skin Diseases in the Philadelphia Polyclinic.[1]

NAPHTOL was first brought to the notice of the profession by Professor Kaposi, of Vienna, about two years ago[2] as a sort of substitute for tar and its preparations. The substance used by him is the β naphtol of chemistry, a derivative of coal tar which occurs in commerce as an indistinctly crystalline substance of a dusky mulberry colour, semi-transparent, and resembling coarse rock salt.[3] It has a faint odour, slightly like that of coal tar, but at the same time aromatic. Its chemical constitution is said to be represented by the formula $C_{10}H_8O$. It melts at 122° C. and boils at 290° C. It is soluble in an equal weight of alcohol, very slightly so in water, but readily in alcohol and water. It is also soluble in fixed oils and fats. In solution and ointment its odour is scarcely perceptible. In thin strata the preparations of naphtol are colourless; after long exposure to the air they become red. They do not stain the skin or hair, and do not usually discolour linen or other dressings. The solution

[1] Read before the American Dermatological Association at its seventh annual meeting, Lake George, August 30, 1883.

[2] Wiener Med. Wochenschrift, Nos. 22 and 23, 1881.

[3] More recently a recrystallized naphtol, in fine gray pearly scales, has appeared in the market.

and ointment of naphtol were at first used by Kaposi in various strengths, from one quarter to ten per cent., or even higher.

A later communication from Kaposi[1] gives the result of further and more extensive experience with naphtol. He had treated up to that time about a thousand cases of skin disease, and for the most part with strikingly good results. No untoward effect had been noticed in any case,[2] nor indeed any inconvenience further than a certain amount of local irritation even when the naphtol had been employed in a considerable degree of concentration, and had been applied during a period of several months and over large areas of integument.

According to Kaposi, even fifteen to twenty per cent. solutions of naphtol in oil or ointment fail to irritate the healthy integument when rubbed in or applied on cloths. On the contrary, such applications simply give an agreeable softness to the skin. When, however, the skin is inflamed, even subacutely as in chronic eczema, a single application of a weak, one per cent. ointment will excite acute inflammation. Kaposi's experience also shows that weak alcoholic solutions (one half to one per cent.) react energetically even on healthy integument. After one or two applications the skin becomes brown and desquamates slightly. On pushing the application a little further an erythematous inflammation is excited.

Naphtol is absorbed to a considerable extent by the skin and is excreted by the kidneys, giving the urine a cloudy wine-brown colour. A sort of toleration appears to be established after a time.

The only form of naphtol employed by Kaposi has been that known as β naphtol; he has found the other naphtols irritating in their effects upon the skin.

My attention having been drawn to naphtol by Kaposi's first article, I imported a quantity by the kindness of Mr. H. B. Rosengarten, of Philadelphia, but was prevented from making use of the remedy until the beginning of last spring, when I employed it at first in the clinic at the University Hospital, and later in my service at the Polyclinic, and in a few instances in private practice.

Although the comparatively small number of cases in which I have been able to make use of the remedy would preclude any independent conclusions as to its value, yet I am led to believe that, stated in connection with the conclusions of Kaposi, my results tend to show that we have in naphtol a remedy of considerable virtue in certain skin diseases, and one worthy of a wider trial and employment. I shall now give Kaposi's experience in the various affections in which he has used naphtol, adding the results of my personal experience by way of commentary.

Of the thousand cases treated by Kaposi, 536, or more than one-half,

[1] Wiener Med. Wochenschrift, No. 31, 1882.

[2] Other observers have noted cases where hæmoglobinuria has ensued on the too prolonged use of naphtol or its employment over an extensive surface.

were *scabies*. The formula employed by him in the treatment of these cases is as follows: ℞.—Axungiæ, ℥viij; saponis viridis, ℥iss; naphtolis, ℥iv; pulvis cretæ albæ, ℈ij.—M. In hospital practice a single energetic application of this ointment is made over the affected parts, after which the patient is thoroughly powdered with starch, and wrapped in a linen sheet. In private practice, under-garments of linen are placed upon the patient after powdering the anointed skin, and he can then go about his ordinary avocations. A single day in hospital is enough for scabies patients, no eczematous eruption being excited by the naphtol ointment, and the irritation already existent being greatly allayed. This point, in connection with the total absence of odour in naphtol ointment, gives it very greatly the preference, in Kaposi's opinion, over the ordinary ointments employed in the treatment of scabies. The more eczema there is in connection with the scabies, the more striking is the superiority of the naphtol treatment.

I have had but little experience in the treatment of scabies, since the proverbial cleanliness of the lower class of Philadelphians makes them the very antithesis of the filthy Austrians forming Prof. Kaposi's clientèle. As far as I have had any experience, however, it has been eminently favourable to the naphtol treatment, and I have no hesitation in saying that I believe it to be the very best treatment for this affection which has yet been brought forward. A single case will suffice to show the manner in which the naphtol was employed.

CASE I.—On June 9th last, a young man applied at my service in the Philadelphia Polyclinic for the treatment of a typical though not severe attack of scabies of six months' duration. Extreme cleanliness with some ineffective treatment had prevented the extension of the disease, but well-marked lesions existed in considerable number, chiefly about the hands, axillæ, penis, abdomen, and buttocks. The patient was ordered: ℞.—Naphtol, ℈iv; vaselini, ℥j.—M. To be well rubbed in every evening. The patient returned in a week almost entirely cured, and a few more applications sufficed to remove all traces of an eruption which half a year's treatment had failed to heal.

Hardy, of Paris,[1] whose opportunity for observing scabies is as great as that of Kaposi himself, is enthusiastic in the praise of naphtol in the treatment of this disease. He employs a 10 per cent. ointment, made by dissolving the powdered naphtol in half its weight of ether, mixing with a portion of the vaseline, heating to between 86° and 104° F., and adding the rest of the vaseline with careful trituration. The homogeneous ointment thus made is kept from the contact of air. According to Hardy, this ointment may be used in all stages of scabies, and of the accompanying eruptions. Though slower in its action than sulphur, the itching that sometimes follows the sulphur treatment is absent after the employment of naphtol.

[1] Guérin, Thèse de Paris.

Kaposi has treated seventy-one cases of *eczema* by means of naphtol. In the squamous stage of the disease, when the affected skin is slightly hyperæmic, or is already becoming paler, naphtol may be used instead of tar to complete the cure, a ½ to 1 per cent. ointment being applied once or twice a day, in a thin layer. After each application the patch is to be covered again with powdered starch.

In the squamous stage of eczema a cure is effected more rapidly if applications of alcoholic solutions of naphtol, ¼ to 1 per cent. strength, are made daily. This solution is more apt to irritate than the ointment, and should be carefully watched. When the epidermis takes on a light-brown colour the cure is complete and the naphtol should be withdrawn. In chronic squamous eczema ointments of 2 to 3 per cent. strength may be rubbed in. Naphtol soap may also be used, either rubbed in, or in torpid cases allowed to remain in contact with the skin.

In impetiginous eczema of the scalp, Kaposi uses, with good results, oils of naphtol containing one part of naphtol to one hundred parts of oil of olives, cod-liver oil, or oil of sweet almonds. Intercurrent cleansing by means of spiritus saponis kalinus, alcohol, naphtol soap, or naphtol sulphur soap, may be used to prevent the accumulation of crusts, etc.

In other affections of the scalp, as pediculosis, tinea tonsurans or favus, or where eczema impetiginosum is an accompaniment, Kaposi also employs this treatment, regarding naphtol as an excellent parasiticide.

My experience with naphtol in the treatment of eczema has led me to conclusions entirely opposite to those arrived at by Kaposi, as I have failed in every case where I have used this remedy to obtain any satisfactory result. A number of cases put upon the use of naphtol ointments and washes failed to report the results of treatment, which led to the conclusion that it must have been anything but satisfactory. This occurred with *all* the cases of vesicular eczema.

CASE II.—A child, two years of age, brought to the Polyclinic with an eruption of vesicular and papular eczema about the genital and sacral region; was ordered at first a saturated solution of boracic acid as a wash. But little change taking place in the appearance of the eruption after two weeks' treatment, this was changed to the following: ℞.—Naphtol, ʒj; ung. aq. rosæ, ʒiv.—M. This proved decidedly irritating, and after using it for several weeks the naphtol was stopped, and an ointment of one drachm bismuth subnitrate to the ounce of cold cream was ordered. In *five days* the patient was discharged cured.

CASE III.—A patient suffering with well-marked papular eczema of the body and limbs of a month's duration was placed upon the use of the following wash: ℞.—Naphtol, ʒss; alcohol, fʒj; aquæ, ad Oj.—M. (1.5 per cent. solution). In a few days the patient returned to the clinic complaining that the wash burned the skin without allaying the itching. An ointment of naphtol of the strength of half a drachm to the ounce was then prescribed. This agreed much better with the skin, and allayed the itching, which was a prominent feature. The patient soon after disappeared from view, so that the final result of treatment was not ascertained,

but enough good effect had been produced to confirm Kaposi's statement, that the ointment of naphtol often agrees with the skin, when a wash of even less strength irritates. Here the wash was of about one-half per cent. strength, while the ointment was of nearly six per cent., but the former irritated the skin, while the latter did not.

CASE IV.—In another case of papular eczema, affecting the leg, naphtol was employed in an oily solution: ℞.—Naphtol, ℈ij; ol. amygdalæ, f℥iv.—M. This solution (about 2 per cent.) failed entirely to relieve the itching, or to ameliorate the disease.

CASE V.—In the case of a papular eczema, involving the arm and anterior axillary border, an ointment of naphtol, one drachm to the ounce (12 per cent.), gave rise to great burning with roughness of the skin. Lotio nigra, with zinc oxide ointment, subsequently relieved the patient in a few days.

CASE VI.—An ointment of ten grains naphtol to the ounce (2 per cent.), employed in a case of typical eczema rubrum of the leg, had little or no influence upon the disease, although it did not seem to irritate the skin. A stronger ointment, two drachms to the ounce (25 per cent.), made use of in another case, gave rise to severe irritation and abrasure of the skin, without relieving any of the symptoms.

Employed in squamous eczema naphtol seemed to act more favourably, although further experiment would be desirable to ascertain the proper strength of the ointment.

CASE VII.—A boy, of fifteen, applied at the Polyclinic on July 5, showing a well-marked squamous eczema of the scalp. A solution of half a drachm of naphtol in an ounce of olive oil (nearly 7 per cent.) removed the scales very nicely. At the end of a week these were all gone, but the scalp seemed irritated and about to pustulate. The naphtol was then stopped, and a mild bismuth subnitrate ointment substituted. In three days the scalp was about well. I am inclined to think that in this case a weaker solution of naphtol would have proved more effectual.

CASE VIII.—A slight case of palmar eczema in a child; was directed the use of naphtol ointment, one drachm to the ounce (12 per cent.) After using this ointment some time no effect could be perceived, but the disease was finally, though slowly, removed.

From this series of cases, selected from a considerable number of cases of eczema treated by naphtol, it is plain that its use was in most instances unattended by any perceptible benefit.

Kaposi shows himself particularly enthusiastic over the success of his treatment of *prurigo*, which, in his hands, has now become a curable disease. He has treated thirty-three cases with naphtol. Prurigo being practically an unknown disease in this country, I have had no experience in its treatment.

In *ichthyosis*, of which five cases came under Kaposi's care, he was able to suppress the employment of baths, employing inunctions with a five per cent. naphtol ointment once or twice a day. Under the influence of this treatment the skin is said to become rapidly smooth and supple, and the eczematous complications to disappear gradually. In severe cases

Kaposi begins with the following: ℞. Saponis viridis seu ol. morrhuæ, pts. c; naphtolis, pts. ii, rubbed into the skin, with intercurrent baths, in which naphtol soap is used, until slight exfoliation of the epidermis is produced. After this an ointment of five per cent. strength is to be employed.

Prurigo and ichthyosis naturally require persistent care even after the skin appears to have assumed its normal appearance. One or two baths a week, in which naphtol or naphtol-sulphur soap is used, followed by applications of five per cent. ointment, should be employed. In order to afford protection against absorption, when the treatment has to be carried on for several months, Kaposi recommends that every three weeks an emollient ointment be substituted for a while, or the following ointment may be employed: ℞.—Glycerin. amyli, pts. c; acidi borici, pts. v. If moist or crusted eczema exists, together with the ichthyosis, in any given case, this condition must first be removed before the ichthyosis or prurigo can itself be treated.

I have not yet had an opportunity of using naphtol in ichthyosis, but I think it promises well if we can reason from the analogy of its action on the epidermis in connection with Kaposi's limited experience.

In *psoriasis* Kaposi uses a fifteen per cent. ointment, the action of which is, he thinks, less disagreeable than that of chrysarobin or pyrogallic acid. He especially prefers naphtol in psoriasis of the scalp and face, because it does not discolour the skin or hair, and does not give rise to irritation like the former remedies.

My experience strongly corroborates Kaposi's statements as to the advantages to be derived from the use of naphtol in psoriasis, as the following notes will show:—

CASE IX.—A man, of thirty-four, presented himself at the Polyclinic on June 22, with psoriasis of some years' duration, for which various treatment had been employed with little avail. His scalp was filled with thick yellow masses of scales, and in places, particularly the forehead and vertex, was nearly devoid of hair. There were also numerous well-marked and typical patches scattered over the body. The patient was ordered inunctions with an ointment containing one drachm of naphtol to the ounce of lard, to be applied to the patches upon the body, while a naphtol soap, composed of ℞. Naphtolis, ℥ij; saponis viridis, ℥j. M., was ordered to be used upon the scalp; some of the lather remaining after washing to be left in contact with the surface. No internal treatment was employed.

The result was more striking than I had any reason to expect. Within four weeks the scalp was almost entirely well, and the various patches on the body had in some cases disappeared, leaving a brown stain, while in others, where the rubbing had not been so thoroughly performed, there was still a certain amount of infiltration. The patient, who was much pleased with the result of the treatment, said he had not been so well since the disease first made its appearance. I should add that the season could not have had any effect, as the eruption had in previous years been as bad in summer as in winter.

CASE X.—A second case presented itself in a middle-aged German woman, who had suffered from the disease for fifteen years, and in whom the psoriasis presented itself in large well-marked patches pretty well distributed over body and limbs. She was placed upon four minims of Fowler's solution, which, however, failed to prevent the outbreak of new lesions, and seemed to have but little effect on the older ones. Certain of these, however, having been rubbed with an ointment of naphtol, of the strength of one drachm to the ounce, began to fade and diminish with great rapidity. After about three weeks' treatment, this ointment was changed to one made according to Hardy's formula by dissolving the naphtol in ether and then rubbing up with vaseline. This ointment, used in the strength of one part to ten, or a little weaker than the former, did not seem to agree so well, and was soon dropped. When last seen this patient's eruption was nearly well in all places which had been touched by the naphtol ointment, while some patches which had been neglected were only slightly improved.

Although the naphtol ointment, as used in some other cases of psoriasis coming under my care, failed to give the results expected, yet there were circumstances connected with the eruption, which was in a more acute and inflammatory condition than in the cases given, which would account for this want of success.

I think that naphtol will prove a valuable addition to the remedies at present used in psoriasis. Its efficiency is, I think, nearly or quite that of pyrogallic acid, with less danger of toxical effect when used on large surfaces, and without the tendency to stain. Compared with chrysarobin its action is much less efficient and rapid, but the well-known objectionable features of treatment by the latter agent lead to the contented use of a less powerful but less disagreeable application.

In using Kaposi's naphtol treatment of *seborrhœa* of the scalp, the masses of sebum are first to be softened with oil of naphtol 1 per cent., and then the scalp is to be washed either with spiritus saponis kalinus or with naphtol soap. Afterwards the alcoholic solution of naphtol (25 to 50 per cent.) is to be kept applied for five to seven days. At the end of this time a transparent brown pellicle of smooth, uniform, very adherent epithelium, is found on the pale skin. The usual stimulant applications may then be made to the scalp, or, if hyperæmia persists, the alcoholic solution of naphtol may be once more applied. The same treatment may be employed advantageously, according to Kaposi, in premature alopecia due to seborrhœa in anæmic women or men, as well as in scaly seborrhœa of the nose and other parts of the face.

But few cases either of true seborrhœa sicca capitis or of that form of pityriasis of the scalp which is usually confounded with it, have come under my notice since I have read Kaposi's latest paper on naphtol.

CASE XI.—In one of these cases a young girl presented well-marked seborrhœa of the scalp; great benefit was derived from the use of the following: ℞.—Naphtol, ℈j; sulphuris, ʒss; saponis viridis, ʒiv.—M.

This was used as a soap with hot water to cleanse the scalp once daily, a small portion of lather being allowed to dry on the scalp. At a later date a solution of naphtol in alcohol, twenty grains to the ounce (4 per cent.), was employed in the same case, also acting favourably.

CASE XII.—A second case, also in a female, of fairly well-marked seborrhœa sicca was placed upon an ointment of naphtol in vaseline, one drachm to the ounce, under the use of which very marked improvement was noted during the time the patient was under observation.

In *acne*, *acne rosacea*, *sycosis*, and *lupus erythematosus*, Kaposi has obtained excellent results from the methodical application of naphtol in the form of naphtol soap, naphtol sulphur soap, and a paste composed of alcohol, sulphur, and naphtol. In these cases the foam of the soap is allowed to remain in contact with the skin over night, and is washed off next morning, while some other preparation which will permit the patient to go about his occupations is applied during the daytime. In acne and sycosis "Wilson's ointment" (ung. zinci ox.) may be used for this purpose, while the same ointment or emplast. hydrarg. may be employed in lupus erythematosus. Better still, in some cases, the naphtol application is repeated in the morning until a thin brown epidermic pellicle is formed. This adheres the more closely the more the effect of the remedy is produced, that is, the more the tumefaction and hyperæmia have diminished. In lupus erythematosus this amelioration manifests itself by flattening and disappearance of the edges, which have been sharply cut and deeply infiltrated.

The following paste will often take the place of the soap application: ℞.—Naphtol, gr. iv; sp. sap. kal. gr. c; alcohol, gr. cc; balsam Peru, gr. viij; sulphur precipitat. gr. xl.—M.

Having had no experience as yet in the treatment of these affections by means of naphtol, I cannot, of course, express any opinion regarding the efficacy of the drug.

In *hyperidrosis* of the palms, soles, etc., Kaposi has obtained rapid, often immediate relief by the aid of naphtol applications. In many cases, however, the secretion of sweat returns after a time, just as it does after the use of other agents. Kaposi employs the following formula: ℞.—Naphtol, gr. xxiv; alcohol, ℥j; glycerine, gr. l.—M. This is to be applied twice daily, and followed by powdered starch alone or containing two per cent. of naphtol. In hyperidrosis plantarum, cotton impregnated with the powder may be placed between the toes.

In one case bad results followed the use of naphtol. A patient who had used a five per cent. alcoholic solution for three days had an eruption of bullar erythema annulatum of the palm and back of the hands, which, however, disappeared within eight days after the applications were stopped. In many cases of generalized hyperidrosis, even in consumptives, a one or two per cent. solution of naphtol in alcohol gives relief.

I have treated three well-marked cases of hyperidrosis according to the

method just indicated, with, I must admit, very imperfect success. Two of the three were very slightly if at all improved; and the third case, a very marked one, failed to report, and I am convinced did not benefit by the use of the naphtol.

According to Kaposi, all varieties of *tinea tricophytina* are quickly cured by means of naphtol. The application of a one per cent. alcoholic solution, repeated four or five times in two or three days, or of the naphtol-sulphur soap rubbed in and allowed to dry on the skin, desiccates the patches of disease very rapidly. When the disease is extensive, the following application can be made: ℞.—Saponis viridis, ℥j; naphtol, gr. x; sp. lavandulæ, gr. l. To be followed by the application of powdered starch. One application every two or three nights is enough.

In *tinea tonsurans*, Kaposi has met with good results in the use of naphtol after epilation.

My experience in the treatment of tinea tricophytina by means of naphtol leads me to a very moderate appreciation of the merits of the drug for the destruction of this and the other vegetable parasites.

CASE XIII.—In a case of tinea circinata menti, rapidly merging into parasitic sycosis, an ointment of naphtol and vaseline, a drachm to the ounce, was employed for several weeks entirely without effect, new patches of disease appearing under the ointment. An ointment of double strength (25 per cent.) was then substituted, but only with the effect of irritating the skin.

CASE XIV.—In a second case of an almost precisely similar character, a 25 per cent. naphtol ointment was used for between one and two weeks with some slight improvement. A weak ammoniated mercury ointment being then substituted for the naphtol, speedy recovery took place.

In several mild cases of tinea circinata of the non-hairy portions of the body somewhat better results were obtained.

CASE XV.—A young man presented himself at my office with a half-dollar sized ring of tinea circinata encircling the angle of the mouth on either side. The disease was quite recent, and the very scanty hair was not at all affected. An ointment containing eighty grains of naphtol to the ounce of cold cream was prescribed. I then lost sight of the patient, but ten months later he came to consult me for some other affection of the skin, when he informed me that the naphtol ointment had proved effectual in removing the ringworm.

CASE XVI.—A lady applied at my office for the relief of a well-marked and rapidly growing patch of tinea circinata the size of a silver dollar situated over the left scapular region. She was ordered an ointment of one drachm of naphtol in an ounce of cold cream, and, although this was rather negligently applied, the lesion was gone at the end of about four weeks.

CASE XVII.—A young man came to the Polyclinic about the beginning of July with a narrow, wavy line of tinea circinata extending across the outer forehead, arching from the outer edge of one eyebrow to the outer edge of the other. The disease was of about two months' duration, and was spreading rapidly. An ointment of a drachm of naphtol to an ounce of lard thoroughly applied cured the disease in about a fortnight.

Kaposi does not mention the employment of naphtol in the treatment of *tinea versicolor*. I have used it in six cases. In two of these, where naphtol ointment the strength of one drachm to the ounce was employed, the patients failed to report the result of treatment. In another case, where the ointment was used faithfully for some time, no improvement was shown. A fourth case improved slowly during a month while the patient was under observation, but the treatment was given up as unsatisfactory.

CASE XVIII.—A well-marked case of tinea versicolor, chiefly occupying the chest, but also to some degree the groins, was placed upon the external use of sulphurous acid with sapo viridis, which removed the eruption to all appearance completely. A relapse occurring, the patient was ordered a naphtol ointment, one drachm to the ounce, which after six weeks' use failed to work any perceptible benefit. He was then ordered Vleminckx's solution, of which a four-ounce bottle sufficed to cure him.

The remaining two cases of tinea versicolor did better.

CASE XIX., of eighteen months' standing, used the ointment of one drachm to the ounce for twelve days, and at the end of that time reported very marked improvement. In fact the disease had been entirely removed at all points where the naphtol had been applied. The patient was directed to employ the naphtol ointment more carefully and extensively, but failed to report further progress.

CASE XX., occurring in private practice, was that of a middle-aged man, who had tinea versicolor of thirty years' standing. The naphtol ointment used in this case was only half as strong as that used in the other cases of tinea versicolor, being a half drachm to the ounce. After using it for a week the itching, which had been a remarkable feature of the disease, diminished to a marked degree, and the patient declared he had found no previous treatment of so much benefit. On examination, however, I failed to find very much improvement. After an absence of several months, during part of which time the patient had used the naphtol with benefit, but had neglected it later, he returned with his skin disease about as bad as ever. He was then ordered to use sapo viridis with the naphtol ointment, and disappeared.

I have had no opportunity to employ naphtol in *favus*. Kaposi says he has used a 1 per cent. oil, followed by naphtol soap, with great success.

The conclusion I draw from my experience with naphtol in the treatment of the vegetable parasitic skin diseases is, that while it is a parasiticide, and may be employed in some cases with success, it is much less efficient than the ordinary parasiticides in present use, and possesses no advantage whatever over them.

Kaposi says that *pediculosis pubis* is very satisfactorily treated by means of a mixture of equal parts of olive oil and naphtol. It kills the parasites completely, and has no disagreeable colour or odour like many of the remedies employed. I have had no experience in the treatment of this form of pediculosis by means of naphtol, but have recently employed this formula in pediculosis capitis.

I have thus endeavoured to give some account of my experiments with

this drug in the various affections for which it has been recommended by Kaposi, and I may give my impressions as to its general value in a summary way, as follows:—

1. *Scabies.*—In naphtol we have one of the most efficient and agreeable remedies for scabies which has as yet been brought forward. Both in the rapidity of its action and in its beneficial effects upon the inflamed skin it is superior to any of the means ordinarily employed for the cure of this disease.

2. *Eczema.*—Well spoken of by Kaposi in eczema, naphtol has failed in other hands to give the same beneficial results.[1] In most cases of vesicular and acute eczemas generally its action is simply that of an irritant. On the other hand, it has a limited field of action in the cure of a certain number of squamous eczemas of the scalp.

3. *Prurigo.*—Naphtol is highly extolled by Kaposi in prurigo, but I have had no experience with it.

4. *Ichthyosis.*—Kaposi speaks well of naphtol. I have had no experience.

5. *Psoriasis.*—Naphtol is in my opinion a valuable addition to our external means of treatment in psoriasis. Kaposi speaks well of it in psoriasis of the scalp in particular, and my experience would lead me to place it near chrysarobin and pyrogallic acid in effectiveness without the neutralizing disadvantages of either of these drugs.

6. *Seborrhœa.*—In seborrhœa of the scalp naphtol is a decided addition to our means of treatment. While inferior in some respects to sulphur or carbolic acid, it has a certain range of usefulness which further experience will in all probability more exactly demonstrate.

7. *Acne, Acne-rosacea, Sycosis, and Lupus Erythematosus.*—Kaposi believes naphtol to be of benefit in each of these diseases. I have as yet had no experience in their treatment by its means.

8. *Hyperidrosis.*—Naphtol is highly lauded by Kaposi in the treatment of hyperidrosis, but in my hands it has failed entirely, although used strictly according to his formulæ. I consider it quite valueless in this disease, as far as my experience goes.

9. *Tinea Tricophytina.*—Kaposi considers naphtol an efficient parasiticide, but my experience leads me to regard its effects in ringworm as inferior to those of almost all of the remedies at present used.

10. *Tinea Versicolor.*—I do not know of any experiments of Kaposi's in the treatment of tinea versicolor by means of naphtol. My experiments lead me to regard it as almost entirely inefficient in most cases.

11. *Favus.*—Naphtol is considered effectual in this disease by Kaposi. I have had no experience, but am inclined by analogy to doubt its superiority to remedies hitherto in vogue.

[1] Possibly the employment of weaker preparations may induce a change in my views on this subject. I have not yet had an opportunity to use these.

12. *Pediculosis.*—Kaposi finds naphtol a valuable agent in the treatment of pediculosis pubis. I have had no experience here, but in a single case of pediculosis capitis its action was favorable.

In conclusion, I wish to guard myself from the imputation of too dogmatic assertion as to the merits and demerits of the drug under consideration. It is sometimes difficult to give full clinical evidence for one's opinions, and I desire to say that my experience with naphtol extends beyond the evidence I have given, and has perhaps somewhat influenced my opinion as to the value of the drug. Its exact place in dermatic therapeutics remains to be ascertained, but I am inclined to think it will prove a not unimportant one.

ARTICLE XIV.

PERIOSTITIS OF THE MASTOID; NECROSIS; RECOVERY.

By WM. S. CHEESMAN, M.D., of Auburn, New York.

ON October 12, 1882, I was called to attend a gentleman, æt. about thirty, of not over-vigorous constitution, who had suffered from chronic suppurative otitis media of the left side since an attack of scarlatina in childhood. Some ten days before I saw him his old trouble underwent an acute exacerbation, and after causing great suffering, the "gathering broke," and much blood and a little pus poured out. Temporary relief had been thus afforded, but pain soon returned. His physician, deeming it unsafe to meddle with the ear, had left the case to nature.

Physical examination showed the external auditory canal to be much swollen; within all was pus. Discharge had, however, ceased. No air could be forced through the Eustachian tube by Politzer's method. Hot douches every three-quarters of an hour, anodynes at night, leeches to the tragus and the mastoid, all failed to give relief or secure sleep. The pain was sometimes lancinating, sometimes throbbing, and in addition there was a severe neuralgia of the occipitalis major nerve and of some branches of the trigeminus.

14*th.* Slight swelling and tenderness of the mastoid began, which by the 16th had so much increased that the auricle *protruded* at an angle of 45°, being itself greatly swollen. The temperature ranged at 101° in the evening. Wilde's incision seemed to offer a good prospect of relief, but in a consultation held that afternoon it was thought best to continue poulticing, and to await the formation of pus.

20*th.* Fluctuation was detected behind the ear on a level with the upper wall of the external auditory canal. The hypodermic here drew pus.

Anæsthesia of the skin having been produced by the ether spray, an incision was made, and half an ounce of fetid pus evacuated. At the bottom of the wound the probe detected bare bone over a space about one inch square. The wound was douched with hot carbolized water, and a drainage tube inserted. Relief from pain was immediate, and the patient slept all night for the first time in two weeks.

Under the use of hot douches and poultices the swelling rapidly subsided, and on the 23d, the middle ear was inflated by Politzer's syringe, and the perforation of the drum located in the posterior inferior quadrant. With a loud whistling sound the compressed air forced through it a gelatinous material into the external auditory canal.

Within a couple of weeks the patient was able to go out. The ear was douched and the wound cleansed twice a day. The area of bare bone became rough, and granulations pouted about the mouth of the wound in the manner characteristic of necrosis; but no bone loosened. Dilute aromatic sulphuric acid was used as an injection with a view to dissolving the dead bone. It was deemed unwise to attempt to check the middle-ear discharge till the mastoid trouble should be passed.

All went well until the middle of December. The discharge then became scanty, the patient had chilly feelings, his bones ached, and he vomited. The meatus was swollen and nearly closed; the left cervical glands became indurated and tender; the evening temperature ranged at 101°. At the same time, I found that the probe introduced through the drainage track did not move freely over the necrosed surface, and it was thought that granulations had sprung up and shut off a portion of that surface, damming in pus. Accordingly, the patient was etherized, the wound enlarged, and the whole area of bare bone exposed. It was found that the track in which the drainage tube had been inserted had adhered to the bone immediately at its bottom, and that thus the space around had been shut off from drainage. The whole necrosed area was then scraped bare of a few flabby granulations, and, by means of a dental engine, *burred* away till the bone was seen to bleed, and a smooth and apparently healthy surface remained. I hoped that the tedious process of exfoliation might thus be prevented, and that, living bone having been reached, the wound might granulate from the bottom. This was therefore packed with cotton soaked in balsam of Peru, and poulticed. The temperature range at once became normal, and in a few days swelling subsided and appetite returned. The usual douches of the ear and wound were resumed.

For three weeks it seemed that my hopes were not ill-founded. Granulations formed rapidly over the *burred* surface, and the patient was able to ride and walk out. But on the 3d of January I found the external auditory canal again swollen, the patient complaining of nausea, and the temperature at 100°. Exploration among the granulations detected a pus cavity leading toward the auricle. Though this was thoroughly cleansed

and packed, the symptoms were not relieved. On the 6th the swelling in the auditory canal pointed and was cut, some pus being evacuated. The same day a probe introduced among the granulations at the bottom of the wound entered, greatly to my surprise, the mastoid antrum. How this opening into the cells had occurred, I could not divine. No loose fragments of bone had ever been felt by the probe, and none had been discovered in the discharges; and yet a portion of the outer wall of the antrum had come away. The process could not be termed exfoliation; no flake of bone was ever known to have separated. It seemed rather a disintegration, ulceration; molecular death and removal going on imperceptibly, till the outer wall of the mastoid chamber was perforated. No pus was found within, nor did the antrum or the cells ever become implicated.

During the night of January 7th, the patient had a rigor, and another pocket of pus was found in the anterior wall of the wound. The next day, January 8th, Dr. John Van Duyn, of Syracuse, saw the patient with me. He was etherized, the old incision continued downward to the tip of the mastoid process, a track formed from the lower end of this cut, passing between the auricle and the skull, to the periosteal abscess in the external auditory canal, and strands of silk soaked in carbolized wax inserted as a tent. The cut itself was packed with cotton soaked in carbolized oil, and poulticed. The temperature now rapidly fell to normal, and swelling and tenderness disappeared. The drainage track above described was syringed twice a day, the water escaping from the external meatus. Iodoform was freely used in the dressings.

From this time progress to recovery was well-nigh uninterrupted, granulations growing from the bone, and filling the wound compactly from the bottom. They were repeatedly trimmed down, in order to insure against possible pocketing of pus. Once such a cavity was discovered among them, but when it had been opened and cleansed the symptoms due to it disappeared. It became necessary in about a month to remove a granulation mass that sprouted from the drainage sinus at its entrance into the auditory canal, nearly occluding that passage. This was easily done by means of Bosworth's modification of Wilde's snare. The patient was discharged cured April 28, 1883, nearly seven months after the beginning of his sickness.

REVIEWS.

ART. XV.—*Spinal Concussion.*

Injuries of the Spine and Spinal Cord without Apparent Mechanical Lesion and Nervous Shock, in their Surgical and Medico-Legal Aspects. By HERBERT W. PAGE, M.A., M.C. Cantab., Fellow of the Royal College of Surgeons of England, etc. Philadelphia: P. Blakiston, Son & Co., 1883.

IN 1866 a volume, entitled *Six Lectures on Certain Obscure Injuries of the Nervous System commonly met with as the result of Shocks to the Body received in Collisions on Railways*, was published by the great English surgeon, Erichsen. In 1875 these lectures were expanded into a larger work on *Concussion of the Spine*, which, at the time, attracted widespread attention, and has since been regarded in many quarters as high authority, both surgical and medico-legal. The acknowledged eminence of its author, and the evidence of investigation of surgical literature and of personal experience shown by the book itself, gained for it a foothold which it still largely maintains. The second edition is before us as we write, and we remember reading the first with much pleasure, and turning to it with avidity when, by good or bad chance, an admiralty case fell into our hands as expert. It should certainly receive the hearty endorsement of some socialistic convention, for it has proved one of the greatest practical enemies of corporations, taking money without stint from their coffers —money for litigants, for lawyers, and for experts.

Since the publication of Mr. Erichsen's volume "spinal concussion" has not infrequently been treated at greater or less length in journals and general works on surgery or neurology, most writers, but not all, following blindly in the wake of Mr. Erichsen. The volume of Mr. Page, which forms the basis of the present review, is, however, as far as we know, the first systematic attempt to discuss thoroughly the subject in surgical and medico-legal aspects.

This work will prove of great service. It is a highly practical contribution to medicine and surgery. The author has acted for a number of years in the capacity of surgeon to the London and Northwestern Railway Company, and therefore has had abundant opportunities to become practically acquainted with the subjects which he discusses. A large part, but by no means all of the book, constituted the Boylston Medical Prize Essay of 1881. Notwithstanding the author's connection with a great corporation, the charming spirit of justice to all, which pervades the volume, makes us feel that he has written, as he claims, without any spirit of partiality or bias, and that, although his experience has been, for the most part, gained while acting as surgeon to a railway company, there has been nothing whatever in the circumstances of his appointment to impair, even in the very smallest degree, that free and perfect independence which is the rightful possession of a medical man. His work is worthy of

all commendation, and will, no doubt, rank in the future with those standard volumes which lawyers and medical experts delight to consult and ponder on in preparation for the exigencies of a trial for damages for railway or similar injuries. We have deemed it worthy of a somewhat extended analysis.

The importance of the topics discussed will be better appreciated when the frequency with which injuries of the spine, or supposed injuries of the spine, become the subjects of arbitration, or judicial investigation is fully recognized. Mr. Page points out that injuries of the back more often become the subject of medico-legal inquiry than any other kinds of injury to which man is liable. Of 250 cases, which constituted the whole number in one of his note-books, no fewer than 145 complained of their backs or their "spines." He refers to a similar observation by Rigler, a German writer, who gives statistics which show that since the passing of a law in Germany for the compensation of injured persons on railways the number of injuries or complaints of injuries had enormously increased, and that, moreover, of thirty-six complaints of injury no fewer than twenty-eight were of the back.

Railway and other corporations are, by no means, the only financial sufferers from the popular doctrine of "spine disease" and "spinal concussion." Among those who manage to live a large portion of their time on the charity of benevolent and beneficial societies the "spine" cases form a large contingent, as our own experience during a few years has abundantly shown; and in claims for pension by old soldiers—many of them "old soldiers" in the proverbial sense—the "spine" is found to be a convenient portion of the body to localize not a few of those ills which have had their origin as much in the overflowing generosity of Congress as in the accidents and incidents of war.

In Chapter I., at the very outset of his inquiry, Mr. Page seeks to learn how far the spinal cord is really liable to injury. He at once, of course, acknowledges the grosser lesions of the spinal column and cord, from terrible accidents, which have been as well enumerated by Sir Benjamin Brodie as by almost any author since his time; for example, fractures without displacement, fractures with depression or displacement, and causing pressure on the spinal cord, fractures complicated with dislocation, dislocations not complicated with fracture, extravasations of blood on the surface of the membranes of the spinal cord, narrow clots of blood within the substance of the spinal cord, and laceration of the spinal cord and its membranes.

He quotes and discusses the views and reported cases of Brodie, Abercrombie, Sir Charles Bell, Mayo, Boyer, and Lidell, clearly sustaining the position that in the serious cases of spinal injury attributed to "concussion of the spine," some gross lesion, as hemorrhage, fracture, dislocation, twisting of the cord, or wounding of great nerve-trunks, has most probably occurred. Evidences of such lesions cannot always be had during life, and post-mortem examinations are often imperfectly performed. Even recoveries, or partial recoveries, are as explicable from this standpoint as from that of the mythical concussion. Extravasated blood is sometimes absorbed, and recoveries may take place even after dislocation of the vertebræ. In a final note, Mr. Page gives from the *Lancet* the record of two remarkable cases, which appeared after the chapters of his book were made ready for the press. The first is a case of "dislocation of the fifth cervical vertebra, with reduction and recovery," under the

care of Mr. T. H. Ceely, in the Royal Bucks Infirmary. The second is reported as "a case of recovery after a broken neck," by Mr. C. Jordison, of Malpas.

The analogy between "concussion of the brain" and so-called "concussion of the spinal cord" is examined. We accord entirely with the opinion of Mr. Prescott Hewett, quoted by Mr. Page, that it still remains to be demonstrated that concussion may prove fatal without leaving a trace of injury to the brain-substance. Even in cases of recovery lesions may have occurred, and have been gradually repaired.

It has seemed to us that Mr. Page has devoted too little attention to the views of M. Duret. He confines himself to a single remark, that M. Duret regards the phenomena of concussion as due to change in the tension of the cerebro-spinal fluid rather than to any effects upon the cerebral mass itself. M. Duret's physiological experiments and opinions were ably summarized and reviewed in the *American Journal of the Medical Sciences* for January, 1879, and need only be very briefly alluded to at present. Seeking for the cause and mode of production of concussion of the brain, he found that severe blows upon the head, sufficient to depress but not to fracture the skull, so acted upon the hemispheres and the cerebro-spinal fluid as to cause that portion of the latter contained within the lateral ventricles to pass suddenly through the aqueduct of Sylvius into the fourth ventricle, causing the latter and sometimes the central spinal canal to be dilated or even ruptured, and thus bringing about the phenomena of cerebro-spinal shock.

M. Duret showed that lesions, chiefly in the form of hemorrhagic foci, were produced in cases of concussion by peripheral and ventricular waves of the cerebro-spinal fluid. There hemorrhages were found on the convexity of the hemispheres, at the base of the brain, in the floor of the fourth ventricle, in the substance of the medulla and pons, and even at different points of the spinal cord. One case of traumatic locomotor ataxia is reported, caused by a blow on the side of the head, the lesion consisting of an extravasation under the pia mater covering the posterior columns. Accepting these views we have an explanation of otherwise obscure cases; not from spinal, but from cerebral or cerebro-spinal concussions, the lesions, however, being really gross.

The very first paragraph of Mr. Erichsen's book contains, we think, the expression of an erroneous opinion. Comparing injuries to the head and to the spine, he asserts that if the brain is liable to suffer serious primary lesion and protracted secondary disease from the infliction of slight and perhaps, at the time, apparently trivial injuries to the head, the spinal cord is at least equally prone to become functionally disturbed and organically diseased from injuries sustained by the vertebral column. On the contrary, clinical and pathological experience both sustain Mr. Page in the view which he confidently expresses, that, with very rarest exception, the spinal cord maintains its supremacy as the most securely protected of all the organs of the body.

The spinal cord is infinitely better protected from the effects of blows and jars than the brain; its special attachments, its paddings and buffers, the very thick walls of its bony canals—serve to guard and defend it almost impregnably.

Mr. Page is unable to find cases of concussion, injury of the spinal cord, without real gross damage to cord or column, comparable to cases of concussion of the brain. Even if the analogy in any case holds good,

"it is only in the very rarest instances that it can be unequivocally maintained." He thinks it highly improbable that the spinal cord should be especially liable to suffer injury in railway collisions, no matter how trivial they may be, and even though no damage has been inflicted on or near the spinal column.

Chapter II. of Mr. Page's book is devoted almost entirely to an analysis and criticism of Mr. Erichsen's views on so-called "concussion of the spine." He begins, and very properly, by finding fault with the title "concussion of the spine." The term "spine" is by some applied to the vertebral column; by others to the contents of the spinal canal; by still others to both the case and its contents.

"And to employ for the common injuries received in railway accidents a title which may now mean this, and now that, and very often may mean nothing at all, is to run a risk, it seems to us, of either playing into the hands of those who are using dishonest means to enhance their claims, or of seriously misleading those who, from lack of experience and opportunity, are ignorant of the symptoms and pathology of diseases of the spinal cord."

We will now put in contrast the views of Mr. Erichsen and Mr. Page by a few selected quotations. Mr. Erichsen speaks of "concussion of the spine" as follows:—

"It is a phrase generally adopted by surgeons to indicate a certain state of the spinal cord occasioned by external violence—a state that is independent of, and usually, but not necessarily, uncomplicated by, any obvious lesion of the vertebral column, such as its fracture or dislocation, a condition that is supposed to depend upon a shake or a jar received by the cord, in consequence of which its intimate organic structure may be more or less deranged, and by which its functions are certainly greatly disturbed, so that various symptoms, indicating a loss or modification of innervation, are immediately or remotely induced."

The following quotations may serve to give an idea of the views of Mr. Page:—

"When we meet with paraplegia occurring after severe injuries to the spine, and there be no direct evidence of damage thereto, there is yet strong presumptive evidence, from the lessons of the dead-house, that the vertebral column has itself been severely injured, and that from the immediate consequences of such injuries the function of the spinal cord has been annulled and destroyed.

"Used now to indicate this injury, and now that, here signifying the cause, there the effect, by a writer so distinguished as Mr. Erichsen, it is little wonder that a wider application even has been given to the term, and that, as we shall see by and by, 'concussion of the spine' is used almost indiscriminately both in and outside the medical profession to indicate the injuries which are received in collisions and which become the subject of medico-legal inquiry, although the spinal column and its contents have met with no damage at all. It appears to us nothing less than lamentable that, in laying before the profession and the world the results of his experience upon this subject, and writing from the high vantage ground of an assured position, both as a surgeon and as a teacher of surgery, Mr. Erichsen should not have been more clear, more explicit, and less ambiguous in the use of the phrases which he has employed."

"As has been abundantly pointed out in the preceding pages, there is but scanty proof of the liability of the spinal cord to suffer from concussion, pure and simple, in the absence of simultaneous injury to the spinal column, the exceptional cases being extremely rare.

"And if uncomplicated 'concussion' lesions be so exceptional, and the spinal cord be, as we believe the common experience of surgeons proves it to be, the most securely protected of all the organs of the body, it seems most improbable that it should be prone to incur lesions due solely to indirect and general concussion."

The weakness of the cases used by Mr. Erichsen to illustrate and substantiate this doctrine of "concussion of the spine" is really astonishing, as Mr. Page amply demonstrates.

In attempting a pathological explanation of "concussion of the spine," Mr. Erichsen, as Mr. Page shows, is as unhappy as in some of his other efforts.

"The primary effects of these concussions or commotions of the spinal cord," he says, "are probably due to molecular changes in its structure. The secondary are mostly of an inflammatory character, or are dependent on retrogressive organic changes, such as softening, etc., consequent on interference with its nutrition."

The phrases "molecular changes," "molecular disturbances," are simply made to do duty for ignorance. The nervous system is so constituted that even a jar, shake, or concussion, is more likely to produce vascular than "molecular" lesions, if by the latter is meant change in nerve-cell or fibre.

Mr. Erichsen concludes that the whole train of secondary nervous phenomena arising from shakes and jars of, or blows on, the body, characteristic of concussion of the spine, are in reality due to inflammation of the spinal membranes and cord. What proof of this pathology has ever been presented? It is a remarkable fact, that Mr. Erichsen himself is acquainted with only one case with a post-mortem record; and inquiry as to the merits of this particular case is not very encouraging to his peculiar views. From a careful reading of this case, it would seem likely that it is an instance of posterior spinal sclerosis, the collision and the coming in of the disease being probably simply a coincidence.

In more than one place, and by convincing argument and illustration, Mr. Page shows the utter fallacy of the wide-spread, yet erroneous, impression both throughout the profession and the laity that the effects of a railway collision upon the spinal column or cord are most likely to be remote.

"Our inquiries," he says, "have either been singularly unsuccessful, and they have been made by direct oral and written communications with many professional brethren in all parts of the country—or we must admit that secondary and remote degeneration of the spinal cord, in cases where there has been no distinctive evidence of injury, is very rare indeed. We say *distinctive evidence*, for we hold that we cannot include amongst injuries to the spinal cord those molecular disturbances which must affect every tissue or organ in the body when subjected to any severe general shake or jar. Molecular disturbance is not necessarily molecular disintegration or pathological change, and there is no evidence to show that molecular disturbance is in itself a grave condition, or likely to have evil results, unless there should have been at the time some well-marked pathological lesion such as might *post mortem* be discovered by the eye. Were 'molecular disturbance' to be followed by pathological change as a direct result thereof, the consequences of unnumbered slight injuries would be serious indeed."

Injuries to the muscular and ligamentous structures of the back and of the spinal column are frequent causes of the real symptoms which are present after railway collisions. Mr. Page holds from experience, and from the arguments which he has heard about individual cases, that real but comparatively favourable injuries of this kind combined with the symptoms of general nervous prostration or shock have laid the foundation for the erroneous views so largely entertained as to the nature of the common injuries of the back received in railway collisions. Pain on move-

ment, tenderness on pressure, pseudo-paralysis the result of a fear of moving, want of freedom in micturition, and a constipation which simulates paralysis of the bowels from lack of the support and help which the lumbar muscles usually provide, conjoined with great mental disturbance from shock, lead the patients to feel that they have been stricken with some terrible spinal catastrophe from which they may never recover.

Dr. R. M. Hodges, quoted by Mr. Page in a foot-note, has called attention to these sprains of vertebral ligaments and ruptures of the aponeuroses and muscles of the back, as causes of the phenomena assumed to be those following concussion of the spinal cord.

"They give rise to much local pain, to a rigidity of the spine, a difficulty in rising from the seat, a stiffness in walking, and contribute readily to any disposition on the patient's part to make much of his injury. The attitude, or the cautious and constrained movements of the body, may be made to suggest inferences which cannot be too guardedly accepted."[1]

The spinal nerves are sometimes injured by strain or direct contusion in railway and similar accidents. Hilton, quoted by Mr. Page, in his work on *Rest and Pain*, speaking of a man falling with his back upon the ground, says:—

"It is possible that the spinal marrow, obeying the law of gravitation, may, as the body falls, precipitate itself in the same direction, fall back towards the arches of the vertebræ, and be itself concussed in that way. Or the little filaments of the sensitive and motor nerves, which are delicately attached to the spinal marrow, may for a moment be put in a state of extreme tension, because, as they pass through the intervertebral foramina, they are fixed there by the dura mater, and if the spinal marrow be dragged from them, the intermediate parts must be necessarily put on the stretch, producing at the time the pins and needle sensation, and also explaining the symptoms felt on the following day."

Mr. Page refers to a point of great practical moment to those whose duty it may become to examine cases claiming damages for spinal injury, namely:—

"The importance of learning and paying due regard to the precise history of the accident and of the injury, so that we may escape from the region of cloudland where we hear no more than that a man has been in a collision, and had concussion of the spine and become paralyzed."

The real value of pain in the back as an indication of serious disease is fully discussed. This symptom is almost invariably present in the railway cases; and in the vast majority of cases, when it is not due to muscular or ligamentous strain, it is hysterical or imaginary, and nothing else.

It is a remarkable fact that Mr. Page, with his large experience, has met with no case where spinal caries and ultimate curvature have been produced by injury to the back in a collision.

Our own experience is in accordance with that of Mr. Page, with reference to the traumatic origin of tabes dorsalis. We have met with but few cases where any direct relation could be traced between an injury and the origin of ataxic symptoms, although, in the light of M. Duret's experiments, we admit the possibility of such an occurrence.

Two chapters (IV. and V.) are devoted to the consideration of "shock to the nervous system," as seen after railway collisions. Very wisely he

[1] Boston Medical and Surgical Journal, April 21, 1881.

begins his discussion of this subject by explaining the sense in which he uses the expression shock to the nervous system, namely, as a term applicable rather to the whole clinical circumstances of the case than to any one symptom which may be presented by the injured person. The very lack of precision in the phrase appears suitable to describe the class of cases considered, the course, history, and general symptoms of which indicate some functional disturbance of the whole nervous balance or tone, rather than structural damage to any organ of the body.

Three classes of cases of nervous shock, not including those in which a fatal issue rapidly ensues, are discussed and illustrated: (1) Cases of undoubted collapse from the bodily injury received and from the very distressing surroundings of the accident; collapse or severe shock both from bodily and mental causes. (2) Cases in which the accident has been less severe in its effects upon life and limb, and where the earliest effects of shock have been comparatively slight; here mental predominate over physical causes, although both may be present, and the cases are genuine. (3) Cases which have no history whatever of injury or of the symptoms of collapse, no faintness, nausea, or vomiting, no early reaction from an initial stage of depression, but where the after-history very closely simulates that of the second class of cases; these are examples of spurious nervous shock.

Mr. Page discusses briefly the cases of profound shock or collapse from severe and sudden injuries, whether inflicted upon the head or upon some other part of the body, the condition about which the surgeon usually asks first in cases of grave accident. He does not enter at length into the pathology of shock, stopping only to speak in terms of highest compliment of the very able account of shock in all its bearings, in the *International Encyclopædia of Surgery*, by Mr. C. W. Monsell-Moulin, who sums up the results of experimental physiology by saying that "shock is an example of reflex paralysis in the strictest and narrowest sense of the term—a reflex inhibition, probably in the majority of cases general, affecting all the functions of the nervous system, and not limited to the heart and vessels only."

Great stress is laid upon the element of fear in railway collisions in inducing immediate and serious collapse, and in giving rise to the troublesome after-symptoms in the cases which recover from the first shock. He tells the following interesting story:—

> "How largely fright may of itself be a condition recognized as shock is well shown by a case communicated to us by a surgeon of large experience, who, summoned to a railway station to see and conduct to the hospital a railway servant who had had his foot, as was supposed, run over on the line, found him in a state of collapse, and in greatest alarm as to the injury to his limb. Upon examination it was discovered that the only damage was the dexterous removal of the heel of his boot by the wheel of a passing engine."

The various symptoms which are commonly met with in genuine cases of protracted nervous shock, whether that shock has been due to bodily injury, excluding concussion of the brain, or where the bodily injury has been but trifling, and the mental shock severe, are set forth at length by Mr. Page. In the light of these symptoms, instead of "railway-spines," many of the cases under discussion had better be termed "railway-brains." Headache, sleeplessness, altered pulse and heart-beat, nervousness, asthenopia, and loss of memory are by no means spinal; and even paralysis, anæsthesia, and spasm, whether functional or organic, are as likely, or, on the whole, more likely to be cerebral than spinal.

The happily conceived term "litigation symptoms" is applied to many of the manifestations which follow accidents by railway. Differences of opinion arise between those who have to receive and those who have to provide compensation; litigation ensues and the plaintiff is subjected to the delays, anxieties, and worries of a lawsuit. Patients rarely return to work so long as the question of compensation and the possible disputes attending it remain unsettled. Want of occupation, and sometimes of exercise, leads to wretchedness both of body and mind. Comparing a railway patient waiting for compensation with another, a hospital patient, whose state is as nearly similar as may be, and who is compelled to resume work as soon as possible, the latter gets well, the former lingers month after month.

Mr. Page cites several cases in his Appendix to show that, in serious injury to limb, such as fracture, even if there be extreme collapse at the time of the accident, it is most unusual to meet with the protracted after-symptoms which have been described as due to general nervous shock. The reasons for this are that the injury is precise, definite, and not obscure, complete rest is enforced, and there is but little likelihood of dispute arising as to compensation. "Litigation symptoms" are absent, because litigation is not needed.

To bromide of potassium is attributed the prolongation of the illness and delay in convalescence in some cases. Very properly is the wholesale use of this drug in almost any and every kind of nervous disorder denounced. "It is not by a lavish use of bromides," says our author, "that success in the treatment of neurasthenia, to which many of the cases of railway shock are so nearly allied, is being obtained, even in the most extreme cases, by Weir Mitchell, Playfair, and many others."

In Chapter VI. Mr. Page discusses a class of cases occurring after railway and other injuries which he believes should be placed in the same category with those described so ably by Sir James Paget, under the designation neuromimesis or nervous mimicry of organic disease. Many of Mr. Erichsen's "spinal concussion" cases undoubtedly belong here—are functional or neuromimetric disorders. It must be said, in justice to this eminent surgeon, that he does not overlook the fact of such affections occurring in connection with railway cases. In Lecture VIII. of his work, under the head of *spinal anæmia, hysteria, shock, and unconsciousness, as consequences of concussion of the spine*, he recognizes fully the fact of the occurrence of hysterical and allied affections after railway accidents; he also discourses briefly on those forms of mental or moral shock in connection with those accidents. With Mr. Page, we believe, however, that he sometimes confounds cases of hysteria or neuromimesis with his concussion of the spine. With him, we also believe that very often these functional disorders are mistaken for real structural disease, and that they are very common after railway collisions, when the nervous system has been brought into that state which is the fit soil for their development and growth.

Sir James Paget's views of the existence of a peculiar nervous temperament in cases of hysteria or nervous mimicry, whether in connection with traumatisms or arising independently of these, are reiterated and amplified by our author. Neuromimesis is a localized manifestation of a certain constitution.

"As to what is verily the peculiarity of the nervous constitution, I believe we have nothing fit to be called knowledge. It is even hard to give fit names to

what we may suppose it to be. We may speak of the nervous centres being too alert or too highly charged with nerve-force, too swift in material influence, or too delicately adjusted, or defectively balanced. But expressions such as these, or others that I see used, may be misguiding. It is better for us to study the nervous constitution in clinical facts." (Paget.)

Chapters like these teach the great practical importance of investigations like those embodied in Dr. Tuke's work on the *Influence of the Mind on the Body*, although not written with any such intention. Many of the cases recorded by Mr. Page largely, if not entirely, psychical in their origin, are kept up or made worse by a mixture of hope and uncertainty as to the result of litigation threatened and impending, and are eventually cured by the mental influence of the settlement of the claim; nor are many of these cases unreal or undeserving of some compensation. It is difficult to make some hard-hearted and unemotional people believe to how great an extent fright, anxiety, and similarly mentally acting influences may produce serious temporary or even more or less permanent results. A series of interesting cases of functional or neurometric disorders following railway collisions are detailed.

Although not referred to by Mr. Page, Skey, in his admirable lectures on "Hysteria,"[1] as far back as 1866, forcibly called attention to these cases.

"The light of improved knowledge," he says, "will dissolve the mysteries which daily surround these cases in the form of supposed spinal concussions, partial paralysis, effusions into the theca vertebralis, thickening of the membranes of the brain, spinal cord, and lesions of this organ or that. These, as Dr. Sydenham declares, are but imitations and resemblances, and not realities, and that they deceive the multitude is undoubted. When real disease prevails, there is no difference of opinion among medical men as to its existence."

The chapter on Malingering is equally interesting with the other chapters of this interesting book. A distinction is clearly drawn between cases due to shock to the nervous system, neuromimetric disorders, and cases of malingering. The remarks about feigned and fictitious diseases in general are of value.

"Depend upon it," he says, "if a man has not known disease at the bedside, if from want of familiarity with disease he cannot rightly weigh and balance its different symptoms and signs, he will be almost certainly deceived when a case of fictitious disease comes before him."

The frequent assumption of injury of the "spine" by malingerers is pointed out in strong terms, and by apt illustrations.

A few hints as to the investigation of the oftentimes trying cases discussed by Mr. Page, may prove of service.

Take nothing for granted. Assume, without necessarily allowing the patient to know it, an attitude of scientific criticism. Carefully separate subjective from objective symptoms, and if, on close scrutiny, the latter are practically wanting altogether, a feeling of healthy scepticism should not be restrained. Let the first object be to determine whether or not any real organic lesion of the cerebro-spinal mass in its envelops has occurred. Always follow a systematic plan of examination, never jumping to conclusions; but investigating by successive steps for disturbances of sensibility and mobility; for reflex, vaso-motor, trophic, urinary,

[1] Hysteria, etc. Six Lectures delivered to the Students of St. Bartholomew's Hospital, 1866. By F. C. Skey, F. R. S. London, 1867.

sexual, ocular, and other changes. Once satisfied of the non-existence of serious organic lesion, next differentiate fraud or malingering from unconscious neuromimesis.

Mr. Page has not contented himself with a mere citation of authorities and arguments from general principles. Valuable original cases are found scattered through the book; and in an appendix he gives a carefully prepared table which contains, inclusive of those recorded in the text, two hundred and thirty-four cases. The table shows the sex and age of the patient, the nature of the accident, a general outline of the case, the date of settlement of claims, the time when last heard of after the accident, the condition at this period, the evidences of injury to the spinal cord and membranes, and general remarks. The cases forming the table are not selected. He simply has chosen the first two hundred and fifty cases of his note-book, and excluding therefrom those cases where injury had been sustained in some other way than in collision, two hundred and thirty-four remained.

If our author enforces one general truth more than another, it is that of the folly of trusting too much to appearances. He relates the following case: A man based a large demand for compensation from a railway company on stiffness of his elbow and inability to move his arm, the result of a collision. A verdict incommensurate with his expectations having been recorded, he threw up his arms and exclaimed: "My God! I 'm a ruined man!"

Mr. Sergeant Ballantine, in his entertaining *Experiences of a Barrister's Life*, speaks of two cases in which he was engaged, and in both of which justice miscarried through trusting too much to appearances. These reminiscences are so appropriate to the subject in hand that we may be pardoned for recalling them in concluding this review.

"A gentleman named Glover was the plaintiff in the first of the two cases to which I have called attention. He had been, I believe, member for Reading, and, although no external injury was apparent, it was stated that he had received a serious spinal shock, and that the result might be fatal. His appearance, however, in the witness box did not support this idea, and his manner prejudiced his case exceedingly. It was finical and coxcombical, and many, of whom I confess myself to have been among the number, thought that he was not candid in giving his evidence; and the statements of the doctors, which gave a very grave aspect to the alleged symptoms, had in consequence less weight than they deserved. Lord Campbell took an unfavourable view, and evidently thought that there was gross exaggeration. The jury, coinciding in this opinion, returned a verdict quite inadequate to the injuries it truly represented. Within three months the unfortunate gentleman, a comparatively young man, died, and it could not be doubted that his premature death resulted from the effects of the injuries he had undergone, and which had been correctly indicated by the medical men."

"In the other case, tried, I believe, before the same judge, the plaintiff was brought into court apparently in a moribund state. He seemed scarcely able to articulate, and his limbs were without power or sensibility. According to the doctors, and I do not impugn their truth as to the fact, his powers of sensation had been tested by a needle, which had been inserted in his arm without his exhibiting any sign of feeling; in fact, he created general sympathy, and obtained a very large verdict amounting to many thousands. It was thought useless to move for a new trial. Within a week after the time had elapsed for doing so the plaintiff was recognized climbing Snowden in full activity and strength, and within the twelvemonth was presented with an heir who, thanks to his father having been so nearly killed, was likely to have something to inherit."

C. K. M.

ART. XVI.—*Saint Thomas's Hospital Reports.* New Series. Edited by Dr. ROBERT COREY and Mr. FRANCIS MASON. Vol. XI. 8vo. pp. xvi., 419. London: J. & A. Churchill, 1882.

THE Saint Thomas's Hospital Reports for 1882 is a goodly sized volume, and is freighted with a number of excellent clinical papers. Appended to it are the statistics for the years 1880 and 1881, the former having been crowded out of the preceding volume by the pressure of the work done for the International Medical Congress. But the volume before us is thus rendered doubly interesting by the diversity of the subjects of which it treats.

The opening article, on *Disease of the Aortic Valves probably originating in Malformations*, is from the pen of the late Dr. THOMAS B. PEACOCK, and has attached to it the additional interest of being probably his last contribution to medical literature. An appended plate shows the heart in cross-section, with a satisfactory indication of the post-mortem valvular appearances, which are thus described:—

"The right and posterior aortic segments were blended together, so that the aortic orifice had only two valves, and both of them were much thickened, and the united curtain dropped below the level of the other curtain, so that there was both obstruction to the flow of blood from the left ventricle into the aorta and regurgitation from the vessel into the ventricle."

It is also a matter of interest to note the physical signs produced by this condition during life:—

"The action of the heart is tumultuous and visible over a large space; there is decided prominence in the præcordial region. The dulness on percussion begins at the second interspace, and becomes entire at the third. Laterally it commences to the right of the sternum, and extends beyond the line of the left nipple. At the base there is a systolic murmur, heard most distinctly at the right side and upper part of the sternum; it is short and rough, and is followed by a soft diastolic murmur, which is propagated down the course of the sternum. Toward the apex there is a creaky murmur, which is clearly of independent origin and may be presystolic. It is not heard posteriorly. There may be a slight purring tremor felt at the apex."

Dr. Peacock concludes his paper by a *résumé* of the points which lead him to attribute the disease of the valves to malformation, or, at least, to changes in the condition of the valvular apparatus probably occurring during intra-uterine life.

Mr. OSBORN contributes a paper, entitled *Further Remarks on Anæsthetics*, concerning which his position as chloroformist to the hospital entitles him to speak. It is an addendum to a former paper published in the "Reports" for 1880. There is, however, in this paper very little that is new to us, save an enumeration of the advantages accruing from the use of the Clover Inhaler, which, according to Mr. Osborn, "has become now the favourite apparatus for the administration of anæsthetics in several of the London hospitals." A description of the most approved form of this apparatus would have added to the value of Mr. Osborn's paper; all we are told is that its mechanism is so constructed "that it lies in the power of the administrator to give first nitrous-oxide gas alone, then a combination of gas and ether, and, finally, ether alone." While the practical hints about the effects of the different anæsthetics and the methods of

administration are, as we have said, not very new, they lose nothing in the repetition, for Mr. Osborn is very clear and explicit in his directions.

One of the most interesting papers in the medical series is that by Dr. ORD, on *Some Cases of Paroxysmal Pyrexia simulating Ague.* Dr. Ord gives the notes of four cases in which the pyrexia was to all appearance not due to malarial poison, and the diagnoses were respectively: (1) Ulcerative Endocarditis (confirmed by subsequent autopsy); (2) Jaundice with Obstruction; (3) Syphilis; (4) Renal Calculus. In the first case the "shivering fits" were daily for a fortnight, then every other day, and then every third day. After admission to the hospital the patient had daily rigors for five weeks, when he died. There was on admission "a marked presystolic thrill over the impulse, a systolic murmur at the apex, conducted into the left axilla; and a fainter, apparently independent, systolic murmur over the aortic valve; the arteries were everywhere much thickened, and the pulsation of the brachials and radials was clearly visible." It is noteworthy that, during the whole period of his illness in the hospital, the liver and spleen remained large, and the spleen was tender for one week shortly after admission, facts which tended considerably to complicate the diagnosis. But the post-mortem examination showed that the heart was the main seat of disease, the following lesions being present:—

"(1) Pericardial effusion (15 oz.), with no deposit of lymph in heart or pericardium. (2) Dilatation of both ventricles with hypertrophy of the left. (3) The posterior set of chordæ tendineæ of the mitral valve were ruptured, their ends clubbed, and covered by dark clot. The endocardium showed a white tract where the free ends would have played against it. The rest of the valve was natural. There was no effusion in pleuræ; nothing but congestion and œdema in the lungs. (4) The liver was large, but not obviously diseased. (5) The spleen was large, much congested, and friable; there was an old infarct of considerable size near its lower border. (6) The kidneys were large and pale; on section being good specimens of the large white kidney of chronic Bright's disease."

Such were the lesions presented by this most interesting case; interesting because the diagnosis on the admission of the patient to the hospital seemed to lie between ague, suppurative phlebitis (for he had complained of pain in the left calf, which was swollen and tender), pyæmia, and ulcerative endocarditis, and it was not until he had been under treatment for some days that the diagnosis was finally refined down to ulcerative endocarditis. Dr. Ord refers the pyrexia to the "state of the mitral valve setting up from time to time excitement in the heart, and through the heart in the nervous system."

In the second case cited by Dr. Ord the regular period of intermission was eight days, but the diagnosis was clear from the first, as jaundice was markedly present, and the symptoms pointed "to the existence of gall-stones, probably impacted, either sticking in the vesical duct or not completely blocking the common duct; with this there was abundant evidence of gastro-duodenal irritation."

In the third case the diagnosis was obscure, but there was a specific history, and the pyrexia speedily disappeared after the exhibition of the iodide of potassium. In the fourth case the diagnosis was "ague," but upon the passage of a "stone" the size of a bean from the bladder, the fever abated, and there has been no return for six months.

The cases are all exceedingly interesting and instructive, as are the remarks upon them. Dr. Ord closes his paper by saying: "Two years ago

I witnessed the case of a distinguished Indian officer who had intermitting pyrexia, first attributed to malaria, next to hepatic abscess, and at last proved to be attributable to neither of them, but simply to impacted biliary calculus."

Mr. STONE contributes his notes of *A Case of Tricælian Heart with Insufficiency of the Ventricular Septum*, and the following synopsis of the physical signs and post-mortem appearances will be interesting:—

"There was a distinct systolic thrill over the cardiac region, most marked at a part half way between the left mamma and the sternum, and conveyed upwards in a diagonal line from the midsternal point toward the outer extremity of the left clavicle. This was accompanied by a loud rough sound, also systolic in rhythm, most accentuated at the point covering anatomically the origin of the pulmonary artery. It was not loud at the apex of the heart; was almost lost to the right of the sternum, but was audible over the upper part of the scapula posteriorly, and less distinctly lower down. The heart was somewhat enlarged toward the left side." The autopsy showed a "heart not excessively enlarged, the vessels springing from it quite normal. Ductus arteriosus not pervious. Water injected into the left ventricle through the aorta came out freely through the pulmonary artery. On inserting the finger through the pulmonary valves it met with an obstruction about an inch and a half beyond them. The auricles were normal as regards capacity and thickness of walls. They communicated by a slit-like fissure at the anterior edge of the septum, such as is not uncommon without producing any pathological effect. The walls of the right ventricle were hypertrophied to exactly an equal thickness with those of the left. The cavity of the ventricle was divided into two chambers, one much smaller than the other, and almost completely shut off from it by a firm fleshy partition. These two were in communication through a small circular aperture with cartilaginous margins, studded with vegetations the size of millet seeds, and about a quarter of an inch in diameter. The small oval chamber was an inch and a half long, situated between the general ventricular cavity and the pulmonary valves. These were quite healthy. The septum between the ventricles was perforated by a large semilunar orifice in its upper and undefended space."

Although there was no symptom of cerebral involvement, the brain was found to be considerably diseased, purulent inflammatory deposits extending over the pons and inter-pyramidal spaces, and an old abscess being found in the lateral surface of the right occipital lobe. The whole history is especially interesting, when taken in connection with the cases reported by Dr. Peacock, and already alluded to.

Mr. STONE and Mr. KILNER contribute two papers, one on *The Use of the Continued Current in Diabetes*, and containing the reports of two cases, the other on *Measurement of the Medical Application of Electricity*.

Dr. TAYLOR presents the *Analysis of, and Remarks on, Thirty-one Cases of Enteric Fever*, a paper which gives all the data connected with the cases treated in the Hospital during 1880–81. The prevalence of the fever during November is noted, and also a considerable diminution of cases during the succeeding four months. In 16.1 per cent. of the cases, the rash did not appear at all during their stay in the Hospital, whilst in one case "there appeared at the end of the twelfth week an eruption resembling the tâche bleuâtre of the French authors, with the exception that it was elevated above the surrounding skin." This was in a prolonged, double-relapse case. With regard to the temperature, the writer says:—

"In ten cases only (almost one-third), of which two were fatal, did the thermometer register 105° Fahr., and in only three of these did the fever rise above this point. The highest recorded temperature was 105.6°, which occurred on the seventeenth day of the disease. The patient recovered. A highest temperature of 104° and below 105° was frequent, namely in 13 cases, or nearly a half,

with one death; whilst temperatures between 102° and 104° included 8 cases, or over a fourth. There was no highest evening temperature below 102°. . . . . On the other hand, very low morning temperatures were frequent, for we find one with a record of 94°, five with 95°, and sixteen with 96°, or, in other words, 21 cases whose lowest morning temperatures were between 94° and 96°. Only one of these was fatal, a boy, aged twelve years, in whom the temperature fell suddenly from 102.4° to 96.8° at the date of perforation of the bowel."

Diarrhœa occurred in twenty-eight cases, but in eleven of these constipation had also existed at one or another period of their illness. The tongue was dry in eight cases, dry and brown in nine, and tremulous in four. Fissuring was noted in four cases. Albumen was detected in the urine of eight cases, but in six at least it was only temporary. Marked delirium occurred in eleven cases, in five of which "the greatest intensity of delirium or its very onset exactly corresponded in date with that of highest temperatures, and in three others the events were only two days apart. . . . In all cases in which delirium was severe the thermometer registered 105° or upwards." As regards the treatment for these high temperatures "quinine has been given with only partial success. It has undoubtedly controlled hyperpyrexia, but only very temporarily, and then only when given in such doses as produced effects which may be called toxic." Graduated baths were only administered in two cases, but with very marked effect on the temperatures.

The paper closes with an abstract of the cases of relapse, and may be regarded as a very valuable contribution to the literature of the subject.

Dr. HARLEY'S paper on *Fecal Retention, especially as it affects the Cæcum*, treats of a disease as common as it is slighted by most medical men—chronic constipation. He starts out with the old-fashioned assertions that "constipation is often the forerunner of enteric fever, and so far may be regarded as a factor of that disease. . . . Constipation is occasionally the sole cause of enteric fever." This is not exactly orthodox according to our present lights, but, however that may be, the eight cases which are cited are full of interest to the practitioner who has to fight numberless cases of this same sort in his general practice. Case I. was one of simple idiopathic constipation which had a fatal termination from a persistent neglect of the demands of nature. Case II. was a passive variety of the same condition, which readily yielded to appropriate treatment. Case III. was one of fecal accumulations in the cæcum inducing some of the symptoms of enteric fever. Case IV. was one of fatal constipation, without prominent symptoms, the patient being brought to the Hospital almost *in articulo mortis*, and the post-mortem examination revealing nothing of the nature of obstructive disease. Case V. was one of gradual constipation followed by the sudden appearance of symptoms of obstruction in the cæcum, but which yielded to appropriate treatment. Case VI. Constipation, acute pain in the right iliac region, vomiting after a hearty meal of whelks; fecal tumour of the cæcum, convalescence after twelve days—a case whose title sufficiently explains it. Case VII. Fecal constipation, retention of the fecal matter in the cæcum, fever, etc. Case VIII. Constipation, followed by fever and stercoraceous vomiting, perforation of the stomach and cæcum. The history of these cases is very interesting, and will fully repay careful study.

Finally, Dr. BRISTOWE gives us an important paper on *Hydatid Tumours of the Abdomen and Tumours simulating them:* with the history of three cases, one of hydatid tumours in abdomen, associated with pregnancy; hydatid thrill in small hard tumour only; one of abdominal can-

cerous and hydatid tumours; and one of parovarian cyst simulating an hydatid tumour. The first case is especially interesting. The woman stated that she was three or four months pregnant, and "presented five obvious abdominal tumours, of which three were large, rounded, and elastic, and fluctuated more or less distinctly; and two were small, hard, and judging from palpation solid. . . . Two of the large cysts were successively punched, and from each of them was withdrawn the fluid characteristic of living hydatid cysts, in one instance hooklets of echinococcis being discovered. The third cyst was also reserved for puncture, but the suspicion of pregnancy made a close examination necessary, and the stethoscope developed the fœtal heart-sounds.

The Report ends with the usual statistical tables for both 1880 and 1881. R. P. R.

At the present time, when medical journals bring so promptly to every reader the latest facts and theories, and when they preserve so well whatever is worth recording, it seems a pity to bury in a volume of very limited circulation a paper which deserves to be widely read. Yet this has been the fate of many of those which from time to time have appeared in the large and valuable reports of certain English hospitals. It is true that these reports go out to a number of medical journals, and reviewers pick out and call attention to what is best in them. But, notwithstanding this, it is a sort of burial that a paper undergoes, which is lodged in one of these volumes. Sometimes, however, this is not so great a misfortune to the world as it is to the author—then the loss of one proves to be another's gain.

The volume before us suggests and exemplifies these reflections. When Mr. Nettleship, for example, writes such a paper as here appears under the title *Cases of Orbital Cellulitis presenting unusual Features*, it seems a good saving of the reader's time that he should not be tempted by the writer's name to linger over what is so loose a commentary on such questionable cases. At the same time he will avoid the bad example of a teacher who, while treating eye diseases, records that a patient "says his water is very thick," and never examines that water to see why it is thick.

On the other hand, his report of eight *Cases of Injury to the Optic Nerve*, and such an interesting case as that of *Spondylolysthesis* simply recorded by Robert Cory, M.D., deserve more publicity than they get here: the former because of its instructiveness, the latter on account of the rarity of the condition described. The same may be said of the *Contribution to Pathology of Double Optic Neuritis* by Walter Edmunds, M.D., which gives a very brief account—illustrated by a plate—of the gross and microscopical lesions found in the case of a girl, 8 years old, who was killed by being run over by a horse and cart, receiving, among other injuries, a fracture of the base of the skull. Though she died within twenty-four hours of the accident, the optic nerves were red and swollen just behind the orbit, and showed under the microscope early inflammatory manifestation between the two sheaths, and somewhat within the inner one. This case suggests some questions, not answered in the paper, which seem to us to be well worthy of the attention of neuro-pathologists.

Henry Gervis, M.D., writes *On Topical Applications to the Cervix Uteri during Pregnancy*, and urges the value of such a proceeding in

cases of threatened abortion due to endometritis, of the nausea of pregnancy, of pruritus, and of general uterine uneasiness.

Mr. H. G. ARMSTRONG gives an account of a remarkable result of *Nerve-stretching in a Case of Spinal Meningitis with Ataxic Symptoms due to Injury.* The patient, a man 40 years old, had a fall astride of a piece of timber. After lying by for a week he resumed work and had attacks of pain in the sciatic regions—whatever this may mean—and tetanic spasms, intermittent but increasing in severity and frequency. After two years he gave up work, and for three years before the operation grew worse, having had to spend the last year almost altogether, and the last four months altogether, in bed. At the time of operation he had "severe lightning pains confined principally to the legs and lower parts of the body, though they are occasionally felt in the upper extremities. . . . . The lancinating pains and tetanic spasms in the lower limbs can always be produced by pressure on the skin over the coccyx. Does not attempt to leave his bed, as on trying to walk he falls down." His muscular action in his legs was violent and ill-coördinated, patella reflex absent; he had complete anæsthesia of both legs below the groin and absence of sexual power but not of desire. Muscular electro-excitability was only partially lost. Such being the condition of the patient, Mr. Armstrong cut down upon the *left sciatic nerve* below its exit from the sciatic foramen and stretched it violently. The operation was painless, though done without the use of any anæsthetic. In four days the patient's pains were "very slight," his tactile sensibility was returning in *both* feet. In eleven days this was established over the whole of both lower extremities. In sixteen days his legs were under full and steady control of his will. In twenty-nine days he could walk with "very slight assistance." Within two months he could walk out regularly, and soon took a walk of seven miles before breakfast. His sexual power was also restored. After six months he had some return of his intermittent pains, though they were much less severe than formerly, and in walking he exhibited the characteristic ataxic gait.

Jottings from the Surgical Out-patient Room, by H. H. CLUTTON, M.B.F.R.C.S., Assistant Surgeon to the Hospital, is a very interesting paper, giving an account of several cases. One was a *Fracture of the Clavicle by Muscular Action*, which came under the author's observation six months after its occurrence, and which had healed without surgical assistance. Another case was a *Large Vascular Growth in the Neck* of a baby 7 months old. It involved the floor of the mouth, dated from the child's birth, increased rapidly a few months after. It was brought for six weeks to the hospital and then died at home. No autopsy was obtained. It is noteworthy and unfortunate that nothing is said as to the treatment, and its effect, while the baby was under the author's care.

Three Cases of Nævi of the Face treated by Electrolysis are given. They illustrate the advantages of this method in nævi inaccessible to operation.

A Congenital Hydrocele of the Neck over the sterno-cleido-mastoid muscle, in a child 2 years old, was treated by tapping and injection of tr. iodini and water, in equal parts. After an interval of about two weeks this was repeated, and at the end of three months all that was left was a solid lump, about as big as a walnut, below the angle of the jaw.

The jottings close with an interesting account of a case of *Multiple Fatty Tumours* in a man 44 years old. The author makes a point of

their symmetrical distribution, and believes that such a distribution is so common that it may be regarded as indicating a law.

This paper, aside from its instrinsic value, is commendable as a utilization of a sort of material which is too often wasted in large hospitals. The more striking experiences of the wards are no more valuable to men in general practice, and yet how rarely does one meet with reports from out-patient departments.

The most curious surgical paper in the volume of reports is that by Mr. Bernard Pitts, Resident Assistant Surgeon, *On Six Cases of Abdominal Surgery.*

Case I. was a woman forty-two years old, who had suffered with constipation for several months; nothing passed *per anum* for two weeks. There were present all the signs of intestinal obstruction. A central abdominal incision was made under spray, the hand introduced, and an annular stricture found at the junction of the sigmoid flexure with the rectum. An incision an inch long was now made "in the left groin," the sigmoid flexure was drawn into it and secured by silk sutures, the abdominal cavity was cleansed, the central wound closed, and both wounds dressed antiseptically. About fourteen hours afterward the dressing was cut away from the wound in the groin, the cut margin of the central dressing sealed by strapping dipped in carbolic lotion, and the bowel incised. Gas and eight ounces of dark fluid evacuation escaped, and feces continued to flow slowly for the next six hours. The patient made an uninterrupted recovery. Six months later she passed a "good deal" of her feces the natural way—the artificial anus being about the size of one's little finger.

The second case was one where a reducible left inguinal hernia, in a man forty-five years old, had become strangulated and reduced without the patient's knowledge. An exploratory abdominal incision was made and a knuckle of bowel that had been constricted found. As it looked recoverable, nothing else was done, but the abdomen was closed at once. In the evening the patient became delirious, and died.

The third case was one of strangulated right inguinal hernia, in a man also forty-five years old. He entered the hospital about six hours after his hernia came down, and he failed to reduce it. The next morning it was reduced by the surgeon. The bowel went back in the usual way, but "*without a definite gurgle.*" After a short period of apparent amelioration symptoms of obstruction became pronounced, and Mr. Pitts cut down on and explored the sac, continuing his incision upwards and outwards on the abdominal wall for about three inches. Here a part of the large intestine was found to be ashy-gray and soft for about two inches of its length. This was brought down and fastened to the edges of the wound. An artificial anus formed; but the patient died ten days later of pneumonia and exhaustion.

The fourth case was one of congenital imperforate rectum, in an infant two days old. An attempt to open it through the perineum failed, and then the author opened the left groin and brought up the sigmoid flexure, fastened it to the edges of the wound, and opened it. All went well for a few days, but then the child did badly, and died at the end of sixteen days of surgical kidneys. At the *post mortem* the rectum was found to end in a small opening on the floor of the urethra, just in front of the veru-montanum.

The fifth case was one of a child four and a half years old, suffering with acute intussusception low down in the colon. Inflation with air was

attempted. At first it did not succeed; then the child was suspended by the heels, and by manipulation partial reduction effected with a finger in the rectum and the other hand drawing upon the tumour through the wall of the abdomen; then inflation with air finished the reduction very readily.

The sixth case was a man, forty-five years old, with a large irreducible and apparently strangulated femoral hernia. The tumour was larger than a man's head. The sac was opened and found to contain about a pint of serum besides the cæcum and part of the ascending colon, together with five or six feet of small intestine and a large quantity of omentum, adherent to the sac. A considerable quantity of omentum was removed, the intestines returned, and the sac dissected out. The part of the sac removed measured twenty-six inches in circumference. A radical cure was now attempted by suturing the edges of the sac with catgut. Recovery followed.

A note is added of a case of a woman with a similar hernia, the author had a year and a half before, when an operation was delayed for several days because gurgling could be felt, the result being the death of the patient. On these facts he bases a plea for early operation, which plea is well supported by the cases cited.

Finally, the volume contains an excellent paper by Mr. WILLIAM ANDERSON, *On Congenital Hypertrophy*, which, founded upon one case appearing in the hospital, gives a summary of the present state of knowledge in regard to this rare and curious disorder.

An examination of the *statistical tables* of this volume reveals some interesting and instructive facts. The first is the large number of cases treated in St. Thomas's Hospital. There were, in 1880, 3951, of which 2273 were surgical. In 1881, there were 4174, of which 2329 were surgical.

If we look at the tables of disease, we find the sometimes contested statement of Mr. Allingham, that more cases of fistula in ano are met with than of hemorrhoids, borne out; for, in 1880 and 1881, there were here forty-two of the former and only twenty-five of the latter.

Intussusception shows 2 cases, both occurring in 1880; both were aged three months; both were operated by abdominal section, and both died.

Genu valgum was treated twenty-eight times, sixteen times by subcutaneous osteotomy.

Tracheotomy was done, in 1880, eight times: two for tetanus, two for diphtheria, one for hemorrhage into glottis, one for erysipelatous œdema of the neck, one for dyspnœa from pressure of an aneurism of the aorta—seven ended fatally. (A search through the tables has not been rewarded by finding in which case recovery followed.) In 1881, it was done five times: once for a foreign body, once for diphtheria, once for punctured wounds of the trachea, once for a scald—all of these recovering,—and once in connection with removal of the thyroid gland for bronchocele, where death followed.

The tables of hernia show for strangulated inguinal hernia, in 1880, 23 cases, 8 of which were operated upon, five of the latter dying; no case unoperated died. In 1881, there were 27 cases, 15 operated upon, of which eight died—again no case unoperated died. Of strangulated femoral hernia there were, in 1880, 19 cases, 13 operated upon, of which two died—no case unoperated died. In 1881, there were 14 cases, 9 operated, five of which died—again no unoperated case died. Of strangulated umbili-

cal hernia there were, in 1880, 8 cases, of which 4 were operated, all of which died—one unoperated case put in this table died of exhaustion after nineteen days, without peritonitis and without evidence of strangulation; 3 cases treated only with ice recovered. (In regard to these figures, we would remark, that there seems to be in the report some confusion of the condition of incarceration with that of strangulation.)

In 1880 abdominal section is said to have been done in 4 cases, two already mentioned in speaking of intussusception, one for stricture of the rectum, and one for "etc." (In regard to this the tables are conflicting and contradictory.) In 1881 there were 2 cases of abdominal section proper, both for intestinal obstruction, one after colotomy, and both ended fatally. Two cases are put under this head in the table of operations for 1881, which were only extensions of the incision in operations for inguinal hernia; and there were three of them—not two—all ending fatally.

In 1880 there were 6 operations of lateral lithotomy (left?), one of which ended fatally, and 3 of lithotrity, in one of which there were four stones, 1 being crushed and 3 "removed by Bigelow's apparatus." In 1881 there were 2 operations of lateral lithotomy, one fatal, and one where a calculus was removed by dilating the female urethra. There was also an operation twice set down as a "nephrotomy," which consisted of removing, by incision, a stone lodged in a sinus in the loin "some distance from kidney."

This is a slim showing for two years in the hospital of Cheselden.

Of excisions of the hip there were, in 1880, 17 with but 3 deaths, in one of which there was nephritis, in one hemorrhage, and in one collapse. In 1881 there were 14 with 3 deaths, in one of which the wound was healed, in one almost, and in all evidence of tuberculous disease in lungs or brain, or both.

Of ovariotomies there were, in 1880, 15 with 3 deaths; in 1881, 17 with 4 deaths.

In 1880 there was one ablation of the entire uterus above one-and-a-half inch from the os, with a fibroid tumour, followed by recovery; and one case of fibroid tumour, where "a portion" of the uterus was removed, with the Fallopian tubes, death following in five days from hemorrhage into the abdominal cavity. In 1881 a large intra-mural fibroid was removed with the body of the uterus and ovaries, and the patient died in three days, never recovering from the shock. Another tumour was removed with both ovaries and the upper part of the uterus. The patient died in sixteen hours; the peritoneal cavity, at the autopsy, was found to contain about a pint of fluid blood.

In 1880 the femoral artery was twice ligated in Scarpa's triangle for popliteal aneurism, once after digital compression and forced flexion had failed; both cases were cured. Once the common carotid artery was ligated—for what our examination of the tables has not discovered. In 1881 the subclavian artery was ligated for aneurism of the subclavian (?), which was improved; once the external iliac artery was ligated for aneurism in the left groin, which resulted in "slow consolidation;" once the common carotid artery was tied—for what we cannot discover—the operation being "followed by suppuration of vitreous on same side, secondary hemorrhage, and ligature of lingual artery in the wound." This patient was still in the hospital when the report was made up.

In 1880 there was a case of "branchial fistula" in a young man twenty years old, which was cured. It is a great pity that this is all that is stated

about a case which might have proved very interesting in its details. In 1881 there was one case of perforating ulcer of the foot with diabetes, which ended fatally.

In 1880 there were 5 cases of tetanus treated, in two of which chloroform was given and tracheotomy done; both died. Chloral was used successfully in two cases and unsuccessfully in one. In 1881 there were 2 cases of tetanus; both died; in one morphia and chloroform were used, and in one bromide of potassium, nutrient enemata, and laryngotomy; fifteen minutes after which death occurred.

In 1880 there were 95 cases of erysipelas with 7 deaths; and in 1881 there were 104 with 12 deaths. One of the latter was developed in the hospital, in a man, after an operation for strangulated femoral hernia carried out under antiseptic precautions.

In 1880 there were no cases of pyæmia; in 1881 there were 5, all fatal.

From this abstract it may be seen how interesting and instructive are these statistics, and how suggestive they are in regard to certain surgical disorders and their treatment. They are a very valuable contribution to the literature of surgery. They are not faultless, however. Perhaps this would be too much to expect. But, after making reasonable allowance for clinical errors and for the difficulty a registrar may have in reconciling the accounts received from dressers and internes, there remain here some defects which we think might be corrected without too much trouble, and the correction of which would add to the attractiveness and value of these reports. It may be regarded as a matter of taste entirely, but we do not fancy the expressions: "soft sore" and "smash of foot;" we find "eruption on hand" too vague; "lamboidal" is probably a misprint, but "Collis" (for Colles's) occurs too often to be so explained. We find the punctuation so defective, in a number of cases, as to leave us quite in the dark as to the real significance of the figures and remarks, and occasionally an "*etc.*" upsets our calculations entirely. We find, by investigation, certain cases duplicated without sufficient indication of the fact. In other cases we find that the tables do not agree, and when we search for details of one statement, we are met with only apparent contradictions of it. We find no distinction of hemorrhoids as to whether they were internal or external. And, finally, we are a little surprised to meet among the "Trivial Cases" one of chronic otitis and meningitis, which resulted in the death of the patient.

So much by way of criticism, which we offer not without a pretty good knowledge of the great difficulty of keeping correctly and reporting satisfactorily the surgical records of a large hospital. C. W. D.

ART. XVII.—*Guy's Hospital Reports.* Edited by H. G. HOWSE, M.S., and FREDERICK TAYLOR, M.D. Vol. XLI., pp. 515. London: J. & A. Churchill, 1883.

THE leading article in this bulky volume is a biographical notice of *Joseph Towne*, modeller to Guy's Hospital for fifty-three years, by Thomas Bryant, Senior Surgeon to the Hospital, from which it appears that this skilful artist became attached to the institution in 1826 when a lad of only

seventeen years old. His first work was, curiously enough, the modelling of a human skeleton, accomplished surreptitiously at night for fear of his father's displeasure, and by the advice of a friend he brought it from his native country village to London, and exhibited it to Mr., afterwards Sir Astley Cooper. That great man at once recognized in the rustic youth a true genius for such work, and immediately secured his services for Guy's Hospital, the museum of which seems to have been wonderfully enriched by his productions. Among the numerous examples of felicitous diction with which Mr. Bryant has adorned this memoir, it seems strange to find the following on p. 12: "Mr. Towne was married on September 20, 1832 . . . . and left several children. He left also some models for disposal, the best of which were purchased for the museum of Guy's," etc.

A case of Phosphorus Poisoning which ended in Recovery under the Administration of Oil of Turpentine, reported by C. Hilton Fagge, M.D., forms the second paper, and affords some confirmation of the value of this oil as a remedy as first suggested by Andant, whose detailed essay may be found in the *Annales d'Hygiene* for 1873. Although all the cases of acute phosphorus poisoning previously treated in the hospital had proved fatal, Dr. Fagge admits that the favourable issue in this instance should not be accepted as proof that turpentine is an effectual antidote, since several examples of recovery after hepatic enlargement, jaundice, and other severe symptoms appeared, are on record.

Dr. W. Hale White next reports a curious *Case of Symmetrical Softening of the Corpora Striata*, followed by bilateral descending degeneration with secondary anterior poliomyelitis. This patient's malady seems to have quite baffled the diagnostic acumen of its reporter during life, and the only record of internal treatment is that of the administration of large doses of iodide of potassium, from which we may infer that the idea of some specific neoplasm to be absorbed rather than that of a degeneration to be arrested was entertained. The literature of the subject appears to to have been pretty thoroughly studied.

In a short essay upon *Exophthalmic Goitre with Mental Disorders*, Dr. George H. Savage relates the histories of three cases of Grave's disease complicated with insanity, and of some other instances where insanity was accompanied with one or more symptoms of exophthalmic goitre. Savage asserts that but few cases of fully developed insanity with this variety of goitre are on record, although his experience shows that Grave's disease is more common among the insane than among the sane, and that in the former case the mental symptoms are apt to be of a melancholic order. Under these circumstances there seems to be something special in the type of insanity to which, however, Savage is unable to give any distinctive characteristics in writing, except that the melancholia is of a suspicious kind, followed by mania of a very violent nature, with a tendency to emaciation and death.

The next article is entitled *Cases of Empyema in Children treated by Removal of a Portion of a Rib*, by W. Arbuthnot Lane, B.S. It is founded upon five cases, three of which were successful, the other two proving fatal on the eighth and twenty-second days respectively. Lane advocates the free use of hypodermic punctures over the surface area of a supposed pus cavity in the chest, in order to determine its size and depth; and great care in securing an aperture at the lowest point in order that the whole of the pus may be promptly drained off, and the employment of a large, soft rubber drainage tube for the purpose of securing a continued

about a case which might have proved very interesting in its details. In 1881 there was one case of perforating ulcer of the foot with diabetes, which ended fatally.

In 1880 there were 5 cases of tetanus treated, in two of which chloroform was given and tracheotomy done; both died. Chloral was used successfully in two cases and unsuccessfully in one. In 1881 there were 2 cases of tetanus; both died; in one morphia and chloroform were used, and in one bromide of potassium, nutrient enemata, and laryngotomy; fifteen minutes after which death occurred.

In 1880 there were 95 cases of erysipelas with 7 deaths; and in 1881 there were 104 with 12 deaths. One of the latter was developed in the hospital, in a man, after an operation for strangulated femoral hernia carried out under antiseptic precautions.

In 1880 there were no cases of pyæmia; in 1881 there were 5, all fatal.

From this abstract it may be seen how interesting and instructive are these statistics, and how suggestive they are in regard to certain surgical disorders and their treatment. They are a very valuable contribution to the literature of surgery. They are not faultless, however. Perhaps this would be too much to expect. But, after making reasonable allowance for clinical errors and for the difficulty a registrar may have in reconciling the accounts received from dressers and internes, there remain here some defects which we think might be corrected without too much trouble, and the correction of which would add to the attractiveness and value of these reports. It may be regarded as a matter of taste entirely, but we do not fancy the expressions: "soft sore" and "smash of foot;" we find "eruption on hand" too vague; "lamboidal" is probably a misprint, but "Collis" (for Colles's) occurs too often to be so explained. We find the punctuation so defective, in a number of cases, as to leave us quite in the dark as to the real significance of the figures and remarks, and occasionally an "*etc.*" upsets our calculations entirely. We find, by investigation, certain cases duplicated without sufficient indication of the fact. In other cases we find that the tables do not agree, and when we search for details of one statement, we are met with only apparent contradictions of it. We find no distinction of hemorrhoids as to whether they were internal or external. And, finally, we are a little surprised to meet among the "Trivial Cases" one of chronic otitis and meningitis, which resulted in the death of the patient.

So much by way of criticism, which we offer not without a pretty good knowledge of the great difficulty of keeping correctly and reporting satisfactorily the surgical records of a large hospital. C. W. D.

ART. XVII.—*Guy's Hospital Reports.* Edited by H. G. HOWSE, M.S., and FREDERICK TAYLOR, M.D. Vol. XLI., pp. 515. London: J. & A. Churchill, 1883.

THE leading article in this bulky volume is a biographical notice of *Joseph Towne*, modeller to Guy's Hospital for fifty-three years, by Thomas Bryant, Senior Surgeon to the Hospital, from which it appears that this skilful artist became attached to the institution in 1826 when a lad of only

seventeen years old. His first work was, curiously enough, the modelling of a human skeleton, accomplished surreptitiously at night for fear of his father's displeasure, and by the advice of a friend he brought it from his native country village to London, and exhibited it to Mr., afterwards Sir Astley Cooper. That great man at once recognized in the rustic youth a true genius for such work, and immediately secured his services for Guy's Hospital, the museum of which seems to have been wonderfully enriched by his productions. Among the numerous examples of felicitous diction with which Mr. Bryant has adorned this memoir, it seems strange to find the following on p. 12: "Mr. Towne was married on September 20, 1832 . . . . and left several children. He left also some models for disposal, the best of which were purchased for the museum of Guy's," etc.

A case of Phosphorus Poisoning which ended in Recovery under the Administration of Oil of Turpentine, reported by C. Hilton Fagge, M.D., forms the second paper, and affords some confirmation of the value of this oil as a remedy as first suggested by Andant, whose detailed essay may be found in the *Annales d'Hygiene* for 1873. Although all the cases of acute phosphorus poisoning previously treated in the hospital had proved fatal, Dr. Fagge admits that the favourable issue in this instance should not be accepted as proof that turpentine is an effectual antidote, since several examples of recovery after hepatic enlargement, jaundice, and other severe symptoms appeared, are on record.

Dr. W. Hale White next reports a curious *Case of Symmetrical Softening of the Corpora Striata*, followed by bilateral descending degeneration with secondary anterior poliomyelitis. This patient's malady seems to have quite baffled the diagnostic acumen of its reporter during life, and the only record of internal treatment is that of the administration of large doses of iodide of potassium, from which we may infer that the idea of some specific neoplasm to be absorbed rather than that of a degeneration to be arrested was entertained. The literature of the subject appears to to have been pretty thoroughly studied.

In a short essay upon *Exophthalmic Goitre with Mental Disorders*, Dr. George H. Savage relates the histories of three cases of Grave's disease complicated with insanity, and of some other instances where insanity was accompanied with one or more symptoms of exophthalmic goitre. Savage asserts that but few cases of fully developed insanity with this variety of goitre are on record, although his experience shows that Grave's disease is more common among the insane than among the sane, and that in the former case the mental symptoms are apt to be of a melancholic order. Under these circumstances there seems to be something special in the type of insanity to which, however, Savage is unable to give any distinctive characteristics in writing, except that the melancholia is of a suspicious kind, followed by mania of a very violent nature, with a tendency to emaciation and death.

The next article is entitled *Cases of Empyema in Children treated by Removal of a Portion of a Rib*, by W. Arbuthnot Lane, B.S. It is founded upon five cases, three of which were successful, the other two proving fatal on the eighth and twenty-second days respectively. Lane advocates the free use of hypodermic punctures over the surface area of a supposed pus cavity in the chest, in order to determine its size and depth; and great care in securing an aperture at the lowest point in order that the whole of the pus may be promptly drained off, and the employment of a large, soft rubber drainage tube for the purpose of securing a continued

free discharge. His experience with the method of preserving the periosteum has been quite favourable, no excessive formation of osseous material having obstructed the artificial outlet in any of these instances.

Drs. R. E. CARRINGTON, P. HORROCKS, and W. H. WHITE give in the succeeding paper an account of the *Abnormalities observed in the Dissecting Room of Guy's Hospital, during the Sessions* 1880–81 *and* 1881–82, these being detected in the pursuit of practical anatomy upon 181 subjects. Among numerous minor abnormalities of the muscular system the most important seems to be a muscular slip about three inches long over the right popliteal space, without osseous attachments, which may have been either a slip from one of the hamstrings or a third head to the gastrocnemius. A curious arterial anomaly was the giving off of the innominate artery on the left side of the trachea, which it crossed about an inch above the sternum, of course, in a situation where it might render the operation of tracheotomy immediately fatal. Numerous less important variations in sundry parts of the arterial, venous, and nervous systems were noticed, and in one instance a kidney (Fig. 13) was found in an abnormal position, lying diagonally across the left sacro-iliac synchondrosis and partly projecting into the cavity of the pelvis.

Two Cases of Pulsatile Tumour at the Root of the Neck are described by C. H. GOLDING-BIRD, and F. A. MAHOMED, M.D. One of these was an aneurism accompanied by peculiar symptoms, and the other was a post-sternal abscess which simulated aneurism. The great interest of this paper lies in the fact that by the aid of the sphygmograph Dr. Mahomed arrived at a correct diagnosis in each instance on a first examination, and maintained it throughout, in spite of the conflicting opinions of several eminent medical men who examined the patients at different periods. Dr. Golding-Bird deserves great credit for the honest frankness with which he records the error into which he was led, notwithstanding his careful and faithful study of the history, signs, and symptoms in the latter of these obscure cases.

The first long article in this volume is a treatise on *The Surgical Affections of the Tongue*, by THOMAS BRYANT, written with the purpose of doing something towards filling the gap (as the tongue always does) left by scanty notice of diseases involving this important organ in previous numbers of the Hospital Reports. This paper is illustrated with two superb coloured lithographic plates, and also by three pages of lithographs representing microscopic appearances of some of the morbid growths described. These latter suggest that the drawings have been made under lenses sadly wanting in definition, and leave much to be desired in the way of clearness.

Among congenital affections of the tongue hypertrophy or macro-glossia is represented by two instructive cases, the first of which in a boy was repeatedly relieved by mercurials, and the other in a young man was cured(?), although of twelve years' standing, in a week by ten-grain doses of iodide of potassium. Several examples of nævi and other congenital tumours of the tongue are given; most of these were operated upon, but in one remarkable instance which was not interfered with, cystic degeneration took place resulting in a great amelioration of the condition of the child by the time she reached her twelfth year.

After discussing inflammation and simple ulcer of the tongue Bryant considers at length syphilitic and tubercular ulcerations, cancer of the tongue (in which he strongly advocates operation, and records one instance where

the disease did not return until fifteen years later), and concludes his valuable monograph with notice of that peculiar affection, ichthyosis of the lingual organ, which he has seen benefited by arsenic when not too far advanced, but believes in its confirmed stage must be treated by excision.

Mr. Samuel Wilks contributes a very interesting paper *On Hemianæsthesia*, in which he records several curious cases of real or supposed brain lesions associated with this condition, including one of a Frenchman who was for a time a patient in Guy's Hospital, and after being discharged much improved suffered a relapse, from which he was "miraculously cured" by immersion into the waters of the holy well of Lourdes, in conjunction with the devout prayers of the Archbishop of Cambrai and numerous followers. Wilks also relates some experiments to test the value of the new system of "metallotherapie," the result of which will by no means satisfy its ardent Gallic advocates.

In a brief essay upon *Saturnine Lunacy*, Dr. James F. Goodhart recounts the histories of four patients suffering from this malady, and admirably indicates the importance, from a therapeutic point of view, of diagnosing this little known affection from delirium tremens and from general paralysis, diseases which, at different stages of its course, it may very closely resemble.

In the next article upon *Acute Gonorrhœal Rheumatism*, Mr. J. N. C. Davies-Colley takes occasion to correct the views he expressed some four years ago in the *Obstetrical Journal*, and informs us that he no longer considers the variety of the disease then described peculiar to women, as he has since observed it in three individuals of the male sex. This form Davies-Colley believes is characterized by its appearing during the acute stage of gonorrhœa, attacking at the outset several joints, and afterwards centring in one, most frequently the elbow-joint, and by its affecting especially the fibrous tissues of the articulation, and only secondarily the synovial membrane and cartilages. The affection is not amenable to ordinary anti-rheumatic remedies, the best treatment being to cure the discharge, keep the part perfectly still, apply uniform pressure during the acute stage, and when that terminates resort to passive motion.

Mr. W. H. A. Jacobson furnishes a thoughtful paper *On the Minute Anatomy and Origin of the Enchondromata of the Salivary Glands*, in which, after a concise account of the position, external characters, structure, and treatment of these unsightly neoplasms, Jacobson advances some interesting arguments partly derived from embryological studies of the jaw and ear, etc., in favour of Cohnheim's ingenious theory that the main source of origin for tumours consists in certain relics of fœtal tissues, which, owing either to their being superfluous or to their development being arrested, have never reached maturity, but have remained quiescent in the midst of better developed structures. It must be remembered, however, that plausible as this hypothesis is, it remains as yet entirely without proof, which will from the nature of the case always be difficult, if not impossible, to obtain. The essay is imperfectly illustrated by two lithographic plates, one purporting to represent the microscopic and the other the macroscopic characters of these formations.

The longest article is furnished by Dr. P. H. Pye-Smith, and is entitled *Reports of a Case of Idiopathic Anæmia of Addison*, since called essential, pernicious or progressive anæmia, with a commentary and tables of selected cases. It forms a valuable contribution to the literature of this obscure and remarkable malady, but is too extended for abstract in

our present notice. Dr. Pye-Smith gives tables of: A, 7 cases of fatal and probably idiopathic anæmia, recorded before Addison's description of the disease in 1855; B, 103 selected cases of idiopathic anæmia, followed by death and autopsy, recorded since 1855; and C, 20 cases of recovery from idiopathic and profound anæmia. In regard to treatment Pye-Smith states that he has lost all confidence in iron and phosphorus, but has seen marked benefit follow the administration of arsenic, and temporary improvement result from transfusion of blood. This paper should be studied by every medical practitioner having an obscure or doubtful case of anæmia under his care.

Dr. THOMAS STEVENSON's case of *Poisoning by Aconitine* is the celebrated one of G. H. Lamson, an alleged medical graduate of one of our American colleges, who was convicted and executed for the murder of his brother-in-law, Percy John, in 1881. The rarity of fatal poisoning by aconitine, the combined ingenuity and stupidity of the criminal, and the novelty of some of the points raised in the examination and trial, will doubtless render this case, as Dr. Stevenson anticipates, the leading one on this subject, in forensic medicine, for many years to come. The fatal dose of two grains of Morson's (?) aconitine was probably administered in one of the gelatine capsules so commonly used here in America for the purpose of avoiding the taste of nauseous medicines, and death resulted, after great suffering, in about four hours. The tests relied upon were the effect upon the tongue of the analyst, the reaction with phospho-molybdic acid, and the physiological tests upon mice, which were found to be more satisfactory than frogs for this purpose. One-thirteenth of a grain of the alkaloidal extract obtained from one and a half fluidounces of the urine, in this instance, was so skilfully manipulated by Dr. Stevenson that after it had been tasted by three persons, and tested specifically for morphia and strychnia, the residue sufficed to kill two mice when injected beneath the skin of the back, with all the symptoms of aconite poisoning.

Dr. C. H. GOLDING-BIRD's paper, *Laboratory Notes on the Working of the Histological Class*, contains much of interest to instructors in this important department. His answer to the question, "What is the easiest way of getting sections of tissues for the microscope?" which is commonly put to him, not only by present, but by past pupils, appears to be briefly: Harden the tissue in one-quarter per cent. aqueous chromic acid solution; then soak in gum mucilage, and cut sections by the aid of the freezing microtome. The best form of this instrument is, he asserts, that of Williams, where the freezing mixture is ice and salt; but although "the best," this apparatus has been superseded by Grove's modification, in which ether is employed. The staining materials used are eosine, picro-eosine, and logwood solution. Eosine, he declares, "is no good alone," but in conjunction with hæmatoxylon answers well. The course includes, we are pleased to observe, lessons upon development, as illustrated in the embryo chick, to furnish specimens of which, eggs are incubated as recommended by Balfour and Foster.

Cases of Paralysis of the Abductors of the Vocal Cords, by Dr. FREDERICK TAYLOR, comprise interesting reports of six examples of this affection, coming under Taylor's notice in Guy's Hospital during the last two or three years, with comments upon their respective peculiarities. Two of these instances in which recovery took place are of value, as demonstrating the fact "that dyspnœa and inspiratory stridor, from approximation of the vocal cords, may occur as a temporary affection, which is not

spasmodic, and has not for its remote cause an organic lesion, but probably some condition of nerve-failure, as hysteria or exhaustion."

A long article describing thirteen *Cases of Multiple Small Abscesses of the Liver*, by Dr. R. E. CARRINGTON, is apologized for on account of unnecessary prolixity of detail, because Carrington wished to make the histories complete, in order that their obscurity from a clinical point of view might be apparent. From an instructive analysis of these reports we find that the duration of illness was very variable, running from five to eighty days; that wasting of the body was always a prominent symptom; that abdominal distension was present in eight out of eleven cases; that the liver was enlarged in every instance save one; vomiting occurred in half the cases; rigors were common; and an irregular febrile movement almost universal. Carrington states that ten of the examples were of infective origin, but no microscopic examination of the smaller foci of inflammation to determine the presence of pyæmic micrococci in the intralobular vessels appears to have been attempted. We would strongly urge our author to undertake such an investigation at the first opportunity which may fall in his way in the future.

An illustrated paper on *Pes Valgus Acquisitus; Pes Pronatus Acquisitus and Pes Cavus*, by Mr. C. H. GOLDING-BIRD, without containing much that is new, does really, as Golding-Bird hopes, tell much that will bear repetition, both on account of its clinical interest and with respect to treatment. Golding-Bird's results in cases of acquired pes pronatus, from a simplified modification of Barwell's apparatus, with an artificial India-rubber "tendon" to draw up the arch of the foot, appear to have been eminently satisfactory.

Another essay by Dr. THOMAS STEVENSON, the industrious lecturer on medical jurisprudence at Guy's, has for its subject *Lead Poisoning*, giving some useful facts in regard to saturnine-water contamination, and reports the first English case of death from the homicidal administration of lead acetate, all of which will be perused with advantage by those of our readers who take an interest in forensic medicine.

The last monograph is by Dr. W. A. BRAILEY, and treats of that somewhat neglected subject, *The Vitreous Body in its Relation to Various Diseases of the Eye*. It gives the results of numerous observations upon the consistency, size, general appearances, and microscopical characters of the vitreous as found in excised eyes, and exhibits a praiseworthy effort to make the best use of opportunities for investigation which comparatively few observers enjoy.

Lists of prizemen, members-elect of the Royal College of Physicians and of Surgeons, appointees, etc., conclude the volume, which testifies to an amount of faithful and diligent medical work of which its illustrious staff may well be proud. J. G. R.

ART. XVIII.—*Sanitary and Statistical Report of the Surgeon-General of the Navy for the year* 1881. 8vo. pp. 684. Government Printing Office: Washington, D. C., 1883.

THE medical corps of the navy, including all grades of the "active list," consists of 168 officers, each of whom has been carefully examined,

before appointment, in reference to his professional, moral, and physical fitness to discharge the duties of his office. These gentlemen are far better qualified as general practitioners when admitted into the navy, than the average of graduates of our medical schools when they begin to practise. The Surgeon-General begins his report with a statement, substantially, that they ably perform their duties, and that a desire to increase their own professional efficiency is common among them. For this reason it is his pleasure to encourage them to cultivate medical science, by placing within their reach whatever facilities and indulgence he is able to command. Medical men thus characterized should be accurate observers; and, therefore, their contributions to medical literature should be entitled to confidence.

In a general way, the results of their work are the materials of the Report of the Surgeon-General.

The amount of money estimated to be needed in the Medical Department of the Navy for the year ending June 30, 1884, and the condition of the Naval Hospital fund are stated in detail; and, next, that 65 cases from the navy have been treated during the year in the Government Hospital for the Insane, and that 50 cases remain, including 6 officers in the number.

Of the *entire force*, including 469 remaining from the preceding year, 14,013 cases of disease were treated. Of these, 11,863 recovered; 1345 were sent to hospitals, 308 discharged from the naval service, 97 died, and 400 remained under treatment at the end of the year. The average daily sick-rate was 457.33, and the average duration of treatment of each case was 11.91 days.

Considered in connection with the fact that all persons in the naval service are "selected lives," the sick-rate and mortality seem to be large. After due examination at the date of enlistment, every recruit is pronounced to be in good condition of health, and free from manifest sign of hereditary or acquired predisposition to disease. Of 6792 adults and 2015 minors examined, 1967 of the former and 783 of the latter were rejected; that is, thirty-one per cent. of the examinates were found not physically qualified for the naval service. The numerous causes assigned for rejecting candidates are classified and appropriately detailed in a tabular form, which covers nearly three pages. *Constitutional diseases* are assigned for the rejection of 151, of which 115 were syphilis; diseases of the eye, 590; diseases of the *circulatory system*, 364; of the *digestive system*, 456; of the *genito-urinary system*, 142; and on account of *defective development*, 661. These rejections imply that at least one class of the working population of the country contains a large percentage of males who are more or less disqualified by physical defects and diseases to depend upon their own labour for a livelihood; and that, sooner or later, they will be objects of public charity.

The FORCE AFLOAT was 9546. The number of cases treated was 9483, or 993.4 per thousand; of which 8278 recovered; 964, or 100.94 per thousand, were sent to hospital; 36, or 3.78 per thousand were invalided from the service; 28, or 3.03 per thousand died; and 176 were continued to the next year.

The admissions to treatment in the Prussian [German?], Austrian, and English navies were respectively 1369.4, 1006.36, and 1172.36 per thousand; the invaliding 99.2, 38.80, and 31.11 per thousand; and the death-rate 2.5, 7.60, and 12.57 per thousand.

A comparison of the relative health of our squadrons shows the admis-

sion-rate of the North Atlantic to be 16.83 per cent.; the Asiatic, 23.70 per cent.; the South Atlantic, 24.81 per cent.; the Pacific, 25.52 per cent.; the European, 27.08 per cent.; and special service, 35.16 per cent. The details are given in a table.

The number of cases of each disease of the classification followed is next given, with a table of details, which occupies ten pages.

Next are presented notes on the *influence of age upon morbidity*, illustrated by a graphic table showing the prevalence of diseases at the different decennial periods and for all ages between 15 and 55 years. This is followed by a table of twenty pages, "showing the number of cases of disease and injury, the number invalided and dead, in decennial periods, with rates per thousand of force at those periods."

The mean force, 9546, is grouped in five decennial periods; in the first, from 15 to 25, are 4191 men; in the second, between 25 and 35, are 3385 men; in the third, between 35 and 45, are 1398 men; in the fourth, between 45 and 55, are 446; and in the fifth are 126 men above 55 years of age.

The death-rate is highest in the fourth decennial period, less in the third, still less in the second, and least in the first. This death-rate corresponds in a general way with the mortuary returns of Philadelphia for 1880.[1]

Under the head of "Sanitary Investigations," studies of different organisms found in air-dust, by Passed Assistant-Surgeon T. H. Streets, follow. The paper is illustrated by two heliotype plates, one of Bacillus subtilis and one of B. ruber.

The report of a board appointed to examine the proposed site of the new Naval Observatory, with reference to its salubrity, is given under the same head. The board carefully examined the topography, buildings, water supply, drainage, soil, and air. Its report, in which chemical analyses and microscopic observations are detailed, is illustrated by seven wood-cuts and four heliotypes, representing Bacteria from water through which air had been passed: Bacteria from sediment of well-water; Bacillus subtilis from well-water, and organisms from atomization of ground air. "After a careful examination of the 'new observatory site,' the board is of the opinion that it is, from a sanitary point of view, a fortunate selection; and that it can become an unhealthy place of residence only in consequence of the neglect of simple sanitary precautions in the future."

The naval force is employed in different regions. Limits are arbitrarily assigned to them. They are called stations, and each is designated by a name. Having treated of the entire force, of the force afloat, recruiting, etc., the Surgeon-General then considers in detail the force employed on each station, beginning with the "sanitary condition of the North Atlantic Station." This includes a region which lies between the coast and the forty-third meridian of west longitude, extending from the equator to fifty-five degrees north latitude. An outline map of the station is given.

The mean strength of the North Atlantic Station was 5000 for the year 1881, distributed in 37 vessels, of which 12 were active cruisers, 9 practice and training ships, 5 receiving ships, 3 survey vessels, and 8 iron-clads in ordinary. The admissions of sick were 911.80 per thousand; discharged recovered, 761.8 per thousand; invalided to hospital, 132.2 per thousand; from the service, 2.6 per thousand; died, 2.6 per thousand.

The sick-rate per thousand in each vessel is given in a table for three

[1] Report on Meteorology and Epidemics. By Richard A. Cleemann, M.D. Transactions of the College of Physicians of Philadelphia, third series, vol. vi. 1883.

years, including 1881, showing, by comparison, marked improvement in the health of this station. The average loss of service per thousand from the several classes of disease is set forth in the same manner. A table shows the classes of disease on account of which patients were transferred to hospitals; another, arranged in the same manner, the causes of invaliding from the service. A table exhibiting the invaliding in each of the vessels, with the ratios for the preceding year, is given; also, one of the number of deaths, with the classes of disease to which they were ascribed, and the mortuary rate per thousand.

Next follow a table of the number of the cases per thousand in each vessel for the years 1879, '80, '81; and then a statement of the number of cases of each disease. The results of 3358 vaccinations are given in a table which shows the per cent. of successful cases.

The number of cases of each disease of each class is stated, and for some of the classes of disease a table of the ratios per thousand of cases occurring in each ship is given for the years 1879, '80, '81, showing the prevalence of the class.

Under "Naval Hygiene" is given an outline of the sanitary condition and cruising of each vessel, arranged in succession according to name, in alphabetical order, beginning with the Alarm and ending with the Yantic. A graphic chart, showing the presence of parts of carbon binoxide to the one thousand in the atmosphere of the interior of the ship; the relative humidity; the percentage of sick, excluding injuries; average strength; average temperature; number of days of snow or rain; number of days on which the berth deck was washed; and the ports visited in every month of the year, is given. Twelve such charts illustrate the hygienic condition of vessels on the North Atlantic Station.

"Hygiene" is succeeded by "Medical Topography and Sanitary Reports," from Surgeon G. F. Winslow, of the Vandalia, Passed Assistant-Surgeon H. C. Ecksteine, of the Alliance, and Passed Assistant-Surgeon H. Aulick, of the Despatch.

Tables, covering 112 pages, in which the whole matter is classified and numerically detailed, closes the report for the North Atlantic Station.

The sanitary condition of the South Atlantic, of the Pacific, of the European, and of the Asiatic stations; of vessels on special service; of naval hospitals; and of naval stations or navy yards, is presented in the same manner. The volume is closed with an admirable "Report on the Pharmacopœias of all Nations," by Surgeon J. M. Flint.

The illustrations consist of five maps to show the limits of the stations, nineteen graphic charts, six heliotypes, and seven wood-cuts. The tables, exclusive of those intercalated in the text, occupy 378 pages. The computations requisite to construct these very full and extensive tables, involve very considerable labour. Whether their results are at present a compensation or not for the work and time they must have cost, it is very probable that in the future, when like data shall have been gathered and tabulated for ten or fifteen years more, they may be a source of information of much value to the navy, and of much interest to the medical profession. At this time, however, a study of these great tables is not likely to be attractive or profitable to medical students who are not employed in naval or maritime medical service. There can be no doubt, however, that Surgeon-General Philip S. Wales is entitled to general commendation for his industrious efforts to secure a faithful and accessible record of the sanitary statistics of the navy. In this particular he is in advance of his predecessors in office. The example of his industry and active interest

in the progress of medical science should exercise a beneficial influence on those whose professional work he leads and generally directs. But a comparison of the number of practitioners, 168, with the number of cases treated, 14,013, suggests that too few fall to the care of one to hold his mind closely to the consideration of medical subjects; and that for lack of professional work he may easily drift into collateral science, general literature, or even into the idle enjoyment of leisure whenever opportunity offers, just as his innate proclivity, or training, or taste, may invite. How to guard against such aberrations, and impart to every member of his corps zeal to labour within the limits of the profession, with little professional work to do, seems to be a problem not yet solved. Remembering the high qualifications claimed, and the opportunities afforded to them in every part of the world for observation in medicine, in the collateral sciences, etc., the medical officers of the navy, as a body, have contributed less to the common stock of our knowledge than could have been perhaps reasonably anticipated. Comparatively few have attempted to do more than the faithful and efficient performance of routine duties require, and beyond this we have no right to insist upon their doing. Yet, it is admitted, spontaneous, volunteer labours have produced most admirable results, and won for the labourers enviable reputation. W. S. W. R.

ART. XIX.—*A Treatise on Insanity in its Medical Relations.* By WILLIAM A. HAMMOND, M.D., Surgeon-General United States Army (Retired List); Professor of Diseases of the Mind and Nervous System in the New York Post-Graduate Medical School; President of the American Neurological Association, etc. 8vo., 767 pages. New York: D. Appleton & Co., 1883.

IT is a remarkable fact that the authors of the only systematic treatises on insanity which have yet appeared in this country have not been connected as superintendents with any of our asylums or hospitals for the insane. These works, three in number are (1) *Medical Inquiries and Observations upon the Diseases of the Mind*, by Dr. Benjamin Rush, published in 1812; (2) Dr. Hammond's *Treatise on Insanity*, the subject of the present notice; and (3) a work on *Insanity; its Classification, Diagnosis, and Treatment*, by Dr. E. C. Spitzka, which has also just appeared. The late Dr. Isaac Ray, for many years superintendent of a New England asylum, was the author of three valuable works, namely, *Mental Hygiene*, the *Medical Jurisprudence of Insanity*, and a volume of *Contributions to Mental Pathology*, but neither of these books was a general treatise on insanity. We simply note the curious fact without attempting to explain it.

The author says of himself in his preface that, although he cannot claim to have seen as many cases of insanity as an asylum superintendent, yet a single case thoroughly studied is worth more as a lesson than a hundred that are simply looked at, and often from afar off.

The manner in which he has made use of his personal experience in giving illustrations of the various forms of insanity is certainly noteworthy; and in numerous instances histories of patients by themselves, their relatives, or friends, are given, and add interest to the pages. The case-books of Dr. R. L. Parsons, late the medical superintendent of the

New York City Lunatic Asylum, have also been drawn upon for much interesting original material. We believe that the prominence which has been given by Dr. Hammond to the recital of illustrative cases will do much to stimulate more careful and elaborate note-taking in our institutions for the insane.

Dr. Hammond's work is divided into four sections. Section I. treats of the general principles of the physiology and pathology of the human mind; Section II. of instinct, its nature and seat; and Section III. of sleep; Section IV. is occupied with the description and treatment of insanity, and constitutes about two-thirds of the book. In the first section subjects of the utmost importance to one desiring to take up the further study of insanity are discussed—the nature and seat of mind, and its divisions, eccentricity, idiosyncrasy, genius, habit, age, sex, etc. The discussion of instincts and sleep, although highly instructive and entertaining, has been carried out at too great length for a practical treatise on insanity. The chapters on sleep and dreams are largely reproductions of a former work by the author on sleep and its derangements. He says that a knowledge of the physiology and pathology of this function should form the groundwork of the study of insanity.

Dr. Hammond's definitions are generally clear, direct, and of no uncertain sound. Mind is a force produced by nervous action, and in man especially by the action of the brain. He divides this force into subforces—perception, intellect, emotions, and will. Perception is that part of the mind whose office it is to place the individual in relation with external objects. It is the starting-point of all ideation. Dr. Hammond holds that there are reasons for believing that all sensations are formed in the optic thalami. He devotes but little space to the discussion of the intellect, a defect, considering the prominent place which intellectual insanities hold in his classification. He holds the intellect to be that mental region where perception is resolved into an idea. An emotion is that pleasurable or painful feeling which arises in us in consequence of sensorial impressions or intellectual action. The will is that mental force by which the emotions, the thoughts, and the actions are controlled. The diagrams showing the connection of an organ of special sense with its perceptive ganglion, and the mechanism of the development of ideas, emotions, and volitions, are very simple, but none the less useful and instructive.

The definition of insanity occupies so much attention in many of our trials, where insanity is plead for the criminal, that we will quote Dr. Hammond's definition.

> "Insanity is a manifestation of disease of the brain, characterized by a general or partial derangement of one or more faculties of the mind, and in which, while consciousness is not abolished, mental freedom is weakened, perverted, or destroyed."

He speaks in flattering terms of the definition proposed by Dr. Thomas K. Cruse, namely, that "insanity is a psychic manifestation of brain-disease;" but suggests adding to it the words "unattended by loss of consciousness," making it read, "a psychic manifestation of brain disease unattended by loss of consciousness." We agree with him that this definition is an admirable one.

We will also give entire the classification of Dr. Hammond, as it is an attempt to embrace all well-established varieties of mental alienation, and will, therefore, at a glance give some idea of the present status of psychiatry. The author holds that a system of classification should not only,

as far as practicable, embrace all well-established varieties of mental alienation, but it should also, at least, make the attempt to arrange them in groups, according to whatever philosophical idea may exist in the mind of its author.

"The system adopted may be wrong, it may be artificial and strained, it may lack exactness and sharpness, in its boundaries, but nevertheless it is better than none, and will at least, by exciting thought in the mind of the reader, lead to discussion, and, perhaps, a better system."

The classification is as follows:—

I. *Perceptional Insanities.*—Insanities in which there are derangements of one or more of the perceptions.

a. Illusions.
b. Hallucinations.

II. *Intellectual Insanities.*—Forms in which the chief manifestations of mental disorder relate to the intellect, being of the nature of false perceptions (delusions), or clearly abnormal conceptions.

a. Intellectual monomania with exaltation.
b. Intellectual monomania with depression.
c. Chronic intellectual mania.
d. Reasoning mania.
e. Intellectual subjective morbid impulses.
f. Intellectual objective morbid impulses.

III. *Emotional Insanities.*—Forms in which the mental derangement is chiefly exhibited with regard to the emotions.

a. Emotional monomania.
b. Emotional morbid impulses.
c. Simple melancholia.
d. Melancholia with delirium.
e. Melancholia with stupor.
f. Hypochondriacal mania or melancholia.
g. Hysterical mania.
h. Epidermic insanity.

IV. *Volitional Insanities.*—Forms characterized by derangement of the will, either by its abnormal predominance or inertia.

a. Volitional morbid impulses.
b. Aboulomania (paralysis of the will).

V. *Compound Insanities.*—Forms in which two or more categories of mental faculties are markedly involved.

a. Acute mania.
b. Periodical insanity.
c. Hebephrenia.
d. Circular insanity.
e. Katatonia.
f. Primary dementia.
g. Secondary dementia.
h. Senile dementia.
i. General paralysis.

VI. *Constitutional Insanities.*—Forms which are the result of a pre-existing physiological or pathological condition, or of some specific morbid influence affecting the system.

a. Epileptic insanity.
b. Puerperal insanity.
c. Pellagrous insanity.
d. Choreic insanity, etc.

VII. *Arrest of Mental Development.*

a. Idiocy.
b. Cretinism.

Some of the forms of insanity here given an abiding place—such, for instance, as hebephrenia, katatonia, aboulomania, etc.—may be new to many, although not unfamiliar to those acquainted with recent neurological and psychiatrical literature. Hebephrenia is the term applied to the insanity of pubescence, a form of mental derangement which presents many characteristic features, and which, as the name implies, is peculiar to that period in both sexes when the organism is undergoing the changes incident to full development. Katatonia is a form of insanity characterized by alternate periods supervening with more or less regularity, of acute mania, melancholia, and epileptoid and cataleptoid states, with delusions of an exalted character and a tendency to dramatism. Aboulomania is a term proposed by Dr. Hammond to describe a form of insanity characterized by an inertness, torpor, or paralysis of the will. Billod first called attention to this condition.

The article on reasoning mania is one of the most interesting in the book, although the profession and public have already become familiar with it during the notable discussion on the case of Guiteau. This case of Guiteau is the first of reasoning mania in which the brain has been examined. The patho-anatomical condition was practically that of incipient general paralysis.

Dr. Hammond's presentation of such medico-legal subjects as sane and insane delusions, lucid intervals, etc., is of such character as to make the book of value as a work of reference in the jurisprudence of insanity. His views with reference to the question of lucid intervals are that full complete intervals in the course of an attack of insanity, during which the individual is well, and would so be pronounced by competent observers, are exceedingly rare; and that they are only to be found in recurrent mania and a few other forms of insanity. Remissions are common enough, but a remission is not a restoration to health, and the patient in whom it is exhibited ought not to be regarded as being possessed of legal responsibility.

Minor defects, and even some of considerable magnitude, are to be found; but they are not such as to mar the work as an exponent of modern mental medicine. A careful condensation of opinions would sometimes have been better, rather than the multiplication of too lengthy quotations. Closer discussion of disputed points would often have been more profitable than repetition of illustrations, however interesting the latter.

Even in the chapter on treatment the entertaining is not absent, as where, for instance, the author recounts the so-called "moral" treatment of Leuret, which consisted in reasoning with the patient relative to the falsity of his delusions, and if he persisted in maintaining them, notwithstanding the arguments adduced, of subjecting him to the cold douche on his head and body generally till he announced that he was convinced.

The times are ripe for a new work on insanity, and Dr. Hammond's great work will serve hereafter to mark an era in the history of American psychiatry. It should be in the hands of every physician who wishes to have an understanding of the present status of this advancing science. Who begins to read it will need no urging to continue; he will be carried along irresistibly. We unhesitatingly pronounce it one of the best works on insanity which has yet appeared in the English language.

C. K. M.

ART. XX.—*Chirurgie Orthopédique. Thérapeutique des Difformités congénitales ou acquisès.* Par le Dr. L. A. SAINT-GERMAIN, Chirurgien de l'Hôpital des Énfants-malades. 8vo. pp. 7, 651. Avec figures. Paris: J. B. Ballière et Fils, 1883.

Orthopædic Surgery. Treatment of Congenital and Acquired Deformities. By Dr. L. A. SAINT-GERMAIN, etc.

THE French books on orthopædics, published only about fifty years ago, are distinguished by a profusion of pictures representing complicated apparatus for the treatment of deformities of the spine—beds, chairs, swings, ladders, see-saws, ropes to climb, and a hundred other things of this kind. The French book before us is remarkable for an almost total absence of such cuts, while, on the other hand, it contains most elaborate engravings to illustrate ablation of the tongue, the anatomy of the eye, the operation for strabismus, the condition of and operation for imperforate anus and hypospadias, as well as figures of the tracheotomy tube and simple artificial limbs. To whatever this may indicate of the scope of the book may be added, that it treats also of such heterogeneous subjects as malformations of the nose, ears, and teeth, congenital hypertrophy of the tongue, fissure of the palate, erectile tumours and nævi, umbilical malformations, hernia, exstrophy of the bladder, infantile paralysis, polydactylism and syndactylism, and *obesity;* in addition to the deformities which are usually thought of when orthopædics are mentioned.

To include all these it was necessary that the author should formulate a new definition of orthopædics. And he did so, claiming that the study of orthopædics embraces all deformities, congenital or acquired; in other words, that it is a sort of cosmetic art.

This wide range of study has introduced the most serious defect of the book before us. It is too large; and there could be well spared from its pages many which do not add a value proportionate to their number. This objection being made, however, there is little to find fault with. The author's views are in the main a faithful reflex of the prevailing opinions in regard to the pathological conditions and treatment of deformities. It is not only clear that he is familiar with the best that has been written in England, as well as in France, upon this subject, but everywhere are to be found the evidences of experience to justify or to correct the affirmation of others. The author conveys his own opinion in a pleasant, often amusing, and sometimes humorous, style. He dwells mournfully upon the "decadence of the nose," and, while stating that it cannot be accounted for because of a decadence in suckling, states, also, that he does not think it attributable to the decrease in the habit of snuff-taking. In speaking of harelip, he cites Bouisson as glorifying Providence for the rarity of the most dangerous form of this malformation, and takes that occasion to warn his students against the tendency to bring in "final causes." When he denies the truth of what are called maternal impressions, he tells a story of a pregnant woman who came to him saying she knew she would give birth to a squirrel, because one had lately leaped on her shoulders and frightened her. Instead of taking the path most men would have struck into under such circumstances, he first assured the prospective mother how easy a confinement she would have in case it turned out as she anticipated. In another place he calls his students'

attention to a peculiar, but not an unknown, paradox in surgery in these words: "You have all seen . . . those enormous tumours, which, when measured daily, diminished two millimeters each day, and which at the end of the year had increased one-half." The entertainment afforded by such *jeux d'esprit* receives an addition of surprise when, in a scientific work of this character, and written by a Frenchman, one finds an allusion to *Dickens's* "fat boy," or to the city of Cincinnati as "Porcopolis," or a deprecation of an English surgeon's commentary on Sayre's method of treating scoliosis—that it was "hanging a man and then taking a cast of him." What could be more striking, more unlikely to be forgotten, than an opinion expressed as follows? "A scoliotic child is placed in the middle of a well-filled amphitheatre, when a few competent men, *rari nantes*, are found in the midst of a crowd of assistants, entire strangers to the subject. The child is shown on all sides, and presents a superb lateral deviation. He is placed before a gauge, and his height is found to measure, I will suppose, 1.42 metres. At once the chin-band and halter are applied. The child is swung to the breezes, and, thanks to previous repetitions, bears the ascent very well. Immediately the assistants precipitate themselves upon him and swathe him in a plaster jacket, . . . which dries with astonishing rapidity. The apparatus once dry, the child is laid on the ground; he is brought back to the gauge; he measures 1.45 metres. Result: 3 centimetres gained. General enthusiasm. Apotheosis." And how complete the idea when, after describing the loosening of the fit of the jacket in a few days, and the determination of this fact, *in a ward*, the author adds: "The amphitheatre is not there. You cannot get the enthusiasts of the day before together again, to show them the annulment of the marvellous result. Their position is settled. They have witnessed a miracle, and go everywhere propagating error." Again, in reference to early operations for harelip, done by accoucheurs, we read: "If we were still in the times when the different provinces of the medical art foraged upon their reciprocal frontiers, and undertook, *à propos* of these limits, veritable wars, one could not fail to say that the accoucheurs made haste to operate upon the little patients while they had control of them, or that, justly impressed with the sad tribute which the first years of early infancy pay to mortality, they were unwilling that harelips should disappear without having enriched science with their observation."

So much for our author's style, which is further enlivened by admirable historical and other references to both ancient and modern authors. The matter of his work is excellent. It might be objected that he finds too much to complain about in others, and it could hardly be claimed that his preface is a model of modesty. Nevertheless, his book is a valuable and an interesting one. If it were less so, it would never be read. As it is, we think it ought to be, and will be. C. W. D.

Art. XXI.—*A text-book of Pathological Anatomy and Pathogenesis.* By ERNST ZIEGLER, Prof. of Pathological Anatomy in the University of Tübingen. Translated and edited for English students by DONALD MAC ALISTER, M.A., M.B., Member of the Royal College of Physicians, Fellow and Medical Lecturer of St. John's College, Cambridge. Part I. General Pathological Anatomy, pp. 360, figs. 117. London, Macmillan & Co. 1883.

FROM the able translator's preface we learn that this excellent work of Prof. Ziegler's grew out of attempt to revise Förster's well-known manual of pathological anatomy, which it was gradually found would be almost equivalent to writing a new treatise, and the latter alternative was therefore finally adopted. Prof. Ziegler explains that a great part of his text is based upon observations made or verified by himself, and when he has drawn from other sources the needful authorities have been carefully cited. The present English version was begun on the basis of the first German edition, but a second edition was so quickly called for in Germany, that time was secured to embody in this, valuable additions made by the author, together with many improvements agreed upon by Dr. Ziegler and his English translator. The latter states that he has besides added full notices of many French and English memoirs which throw light upon subjects treated of in the text.

The style of this book is far superior to the rugged and idiomatic one, which is too often inflicted upon students in translations from the German. In fact it leaves little to be desired in the way of elegance, correctness, and perspicuity. Its method of arrangement is admirable, its descriptions often models of clearness and brevity, and its illustrations, which really do illustrate, are numerous, superbly executed, and in most instances so minutely accurate, that they might be mistaken for copies of photo-micrographs from the diseased tissues themselves.

The first section of the book is devoted to malformations, treating of deformities in single individuals, and of double monstrosities. In Section II. are considered anomalies in the distribution of the blood and the lymph. Sections III. and IV. are devoted respectively to the retrogressive and progressive disturbances of nutrition, whilst Section V. discusses inflammation and inflammatory growths, under which in a subdivision of "The infective granulomata" are grouped tubercle, syphilis, leprosy, lupus, glanders, and actinomycosis. The important subject of tumours fills the fifty-nine pages of Section VI.; and Section VII. on parasites, though last, is the newest and most important of all, at least from the stand-point of the great medical science of the future—preventive medicine.

The dwindling minority of progressive physicians who still shut their eyes to microscopic evidence, and "don't believe in bacteria," will find little aid and comfort in Chap. XXX., which devotes over forty pages to the schizomycetes or bacteria, their morphology, development, and pathological effects upon the human organism. This full recognition in a systematic work of the momentous fact that general diseases *are* produced by organic entities, which scarcely a decade since was practically ignored by such representative German pathologists as Rokitansky and Rindfleish, and more recently was but briefly touched upon by Wagner and Orth, marks an important epoch in the history of the germ theory of disease, and opens the way for a far more general conception of the zymotic affections

as being the expressions of a constant "struggle for existence" between our own cell elements and low forms of vegetable life (as real and tangible enemies to human existence as is the trichina or the rattlesnake), the growth and development of which within the human system produce the dangerous and often fatal symptoms of the maladies in question.

Our author follows Cohn in his well-known classification into sphærobacteria, microbacteria, desmobacteria, and spirobacteria, and quotes the corroborative statement of Koch, whose long-continued experiments show "that each species of bacteria possesses characteristic and easily recognizable peculiarities in respect of structure, form, size, and mode of growth of its colonies upon the gelatin" whereon the experiments were conducted.

In connection with the interesting subject of the *conditions of life* for bacteria, obviously so important to the practical physician, because his best remedies in the zymotic diseases must be those which will most satisfactorily check growth and development in the schizomycetes, we find it stated that a certain amount of oxygen is necessary to the reproduction of many forms, but that pure oxygen gas is said to kill them outright. Some curious and valuable information is given in regard to the temperatures above and below which growth of the bacteria ceases; thus it is stated that development of all kinds terminates at a temperature of 5° C., the bacteria becoming stiff and immobile, although they are not absolutely killed even by very extreme degrees of cold. The knowledge of this latter fact seems to explain the remarkable renewal of yellow fever upon the U. S. S. Plymouth a few years since, and would have promptly ended the plausible but worthless scheme for destroying yellow fever germs by cold, involving an expenditure of several hundred thousand dollars, which was almost successfully urged through Congress during our last great epidemic. Under the head of influence of non-nutritive or foreign substances in the nutrient liquid, are considered the action of different bacteria upon each other, and also the effect of various mineral and other substances, constituting the invaluable group of disinfectants. Among these chief weapons in the sanitary armamentarium, corrosive sublimate is given on the authority of Koch, Wolfhügel, and others the first place.

The bacteria are divided by our author from a pathological stand-point into, 1st, those which are passing all the time through the human body, without being able to find in it conditions favourable for their development; 2d, those which find their appropriate soil in the perfectly healthy organism, in which they grow and multiply; and 3d, "those which are unable to settle in a perfectly healthy body, but can only develop when the physico-chemical condition of the tissues is morbidly altered so as to correspond with their requirements." The two latter of these varieties are grouped together under the title of the *Pathogenous bacteria*, and comprise, of course, the chief representatives of interest to the physician and pathologist.

It would occupy too much space for us to enter upon a detailed review of all this important chapter, and we will therefore merely remark, *en passant*, that Fig. 76, showing a section containing colonies of micrococci from the vocal cord of a child; Fig. 77, exhibiting micrococcus septicus in hepatic capillaries, with necrosis of the liver cells; Fig. 78, bacillus anthracis, liver cells unaffected; Fig. 79, displaying under a low power the first stage of hepatic abscess depending on obstruction of a venule by pyæmic micrococcus, and Fig 80, picturing Koch's bacillus tuberculosis, all admirably represent these important downright facts in pathological histology, and are therefore worthy of most attentive study.

Chapter XXXI. upon the hyphomycetes and blastomycetes (moulds and yeasts) as pathological agents, and Chap. XXXII. upon the animal parasites, are both elaborate yet concise, and continue the same display of a master's hand, in the work of description and explanation, which characterizes the earlier portions of the volume.

Perhaps it is hardly just either to the author and translator or to our own readers, to judge this book by the portion which is now before us, but if the promise here given is fulfilled in Part Second, devoted to special pathological anatomy, we feel sure that a systematic text-book will be supplied, so fully abreast of the advances recently made in this most progressive of the medical sciences as to render it extremely valuable to practitioners and students alike—one which must accomplish much towards securing for pathological anatomy its rightful place, as the chief corner-stone of all true medical science. J. G. R.

ART. XXII.—*The Transactions of The Medico-Chirurgical Society of Edinburgh.* Vol. I. Session 1881–82. 8vo. pp. 188. Oliver and Boyd, Publishers to the Society, Edinburgh, 1882.

ALTHOUGH founded in 1821, this is the first year in which the transactions of the society have been published in book form. By the catalogue of members given, we find that there are 151 resident, and 85 non-resident members. Dr. George W. Balfour is the President of the Society, having been elected for two years, in January, 1882. The society holds nine meetings in the year, and the sessions are of general interest, as a great variety of subjects are presented; patients are introduced, and morbid specimens, miscellaneous objects, surgical appliances, casts, drawings, photographs, etc., are exhibited. Eighteen original papers were read and discussed; ten patients exhibited; twenty pathological specimens shown; six foreign bodies, also; besides surgical appliances, photographs, etc. Original communications were presented upon the following varied subjects.

1. Anatomy of the pia mater, by Dr. J. Beatty Tuke, M.D.
2. Hereditary transmission of disease, by George Leslie, M.D.
3. Action of the auricles in health and disease, by George A. Gibson, M.D.
4. Arguments in favour of the theory of dilatation of the heart as the cause of cardiac hæmic murmurs, and of the appendix of the left auricle being the primary seat of this murmur, by George W. Balfour, M.D.
5. The murmurs of debility in the pulmonary and tricuspid areas, by William Russell, M.D.
6. Notes on the position and mechanism of the hæmic murmur, by George W. Balfour, M.D.
7. A case of diabetic coma with Lipæmia, by Prof. Thomas R. Fraser, M.D.
8. Some of the sequelæ of acute infectious diseases in children, by James Carmichael, M.D.
9. Alternation, Periodicity, and Relapse in mental diseases, by Thomas S. Clouston, M.D.
10. The causes of tinnitus aurium, by P. McBride, M.D.

11. The treatment of syphilis, by Francis Cadell, M.D.
12. On the treatment of fresh wounds, by John Duncan, M.D.
13. On accidental experiment with antiseptics, by the same.
14. Cranial injuries, by Prof. John Chiene.
15. Case of intestinal obstruction, treated by opening the abdomen, by Mr. Joseph Bell.
16. Notes on rupture of the urethra, and its treatment, by Mr. Joseph Bell.
17. Cases of stricture of the urethra, by Francis Cadell, M.D.
18. On a rare form of senile gangrene, by Mr. Joseph Bell.

Many of these papers are very creditable to their authors, and are made of additional value to the reader by the able discussions which are reported as appendices to them. We cordially recommend the volume as one containing much that is interesting and instructive. R. P. H.

ART. XXIII.—*A History of Tuberculosis from the Time of Sylvius to the Present Day, being in part a translation, with Notes and Additions, from the German of Dr. Arnold Spina; containing also an Account of the Researches and Discoveries of Dr. Robert Koch and other Recent Investigators.* By ERIC E. SATTLER, M.D. 12mo. pp. 191. Cincinnati: Robert Clarke & Co., 1883.

IT is a great convenience to English readers to be able to read Spina's *Studies on Tuberculosis* in our own language; and for this opportunity, as far as it is presented, we are indebted to Dr. Sattler. At the same time it diminishes this satisfaction to find that only five sections of Spina's work are thus translated, and that this is followed by two chapters in which it is sought to bring the history of tuberculosis down to the present time, including a full description of the latest experiments of Dr. Spina himself. Spina's own researches included 55 pages out of 122 pages of the original work, but 67 being devoted to the history; while in Dr. Sattler's book, out of 184 pages, 124 are occupied with the translation of Spina's history of tuberculosis, and but 60 are devoted to recent researches, including a full account of those of Koch and others, as well as those of Spina. The apparently necessary conclusion is that it is neither one thing nor the other, neither a translation of Spina nor a history of tuberculosis by Sattler. We think, however, that a sufficient proportion of the book is purely Spina's work to demand that his name, and not Sattler's, should appear on the back of the volume. Had the book been one of 300 or 400 pages, which might easily be written upon the subject, an introduction, consisting of a translation of Spina's history, might have formed a part of it with no other acknowledgment than that in the title-page and preface.

As to the matter written by Dr. Sattler himself, the account of Koch's experiments, as well as that of other investigations since Koch's first paper, will be found very interesting reading, and the methods employed by the various investigators, as detailed by Dr. Sattler, most convenient for reference. If the literature of the subject grows as rapidly in the second as it did in the first year after Koch's announcement, a new edition of the book will soon be required, when we hope to see the names of Spina and Sattler on the back. J. T.

ART. XXIV.—*Disease Germs.*

1. *The Bacteria.* By Dr. ANTOINE MAGNIN, Licentiate of Natural Sciences, Chief of the Practical Labours in Natural History to the Faculty of Medicine of Lyons, etc. Translated by George M. Sternberg, M.D., Surgeon U. S. Army. 8vo. pp. 227. Boston: Little, Brown & Co. 1880.
2. *Bacteria: the Smallest Living Organisms.* By Dr. FERDINAND COHN. Translated by Dr. CHARLES S. DOLLEY. Pamphlet, pp. 30. Rochester, N. Y.
3. *Bacteria and the Germ Theory of Disease; Eight Lectures delivered at the Chicago Medical College.* By Dr. H. GRADLE, Prof. of Physiology, Chicago Medical College. 8vo. pp. 219. Chicago: W. T. Keener, 1883.
4. *On the Relations of Micro-Organisms to Disease. The Cartwright Lectures delivered before the Alumni Association of the College of Physicians and Surgeons, New York.* By WILLIAM T. BELFIELD, M.D., Lecturer on Pathology and on Genito-Urinary Diseases, Rush Medical College, Chicago. 16mo. pp. 131. Chicago: W. T. Keener, 1883.

THE literature of micro-organisms and of their relations to disease has increased to such an extent that some effort at systematic arrangement of our knowledge is not only justified, but necessary to any one who desires to familiarize himself with it. One of the most valuable of these is the work of Magnin, translated by Dr. Sternberg, containing all that is essential as to history and morphology, while the rôle of the bacteria in contagious and virulent diseases is well described to the date of publication. Very useful, too, will be found the pamphlet of Cohn, whose name is better known in connection with bacteria than that of any other naturalist, translated by Dr. Dolley, while a student of medicine in the University of Pennsylvania. The smaller books of Dr. Belfield and Gradle are upon the same subject, which is extended to include the important more recent application to tuberculosis. The two books supplement each other in certain respects; so that the reader who desires to be well informed may read both with advantage. Dr. Gradle's work is almost purely historical, while Dr. Belfield has evidently a leaning towards the infectious nature and parasitic origin of tuberculosis, and he seeks to strengthen his position whenever he can, and of course to weaken the other side. We cannot but think he has ignored a few points on that side which should have been brought forward. The lectures are, however, a valuable introduction to the subject, and should be read by all interested in it, as should also those of Dr. Gradle.

It is out of the question, and indeed would scarcely be profitable under the circumstances, to attempt to give the scope of the subject. But to those who have not kept themselves *au courant* with the literature covering the relation of micro-organisms to disease, it may be interesting to know that the number of diseases in which bacteria are found, either in the secretions, the blood, or the tissues, is so far increased as to include suppurating wounds, abscesses, furuncle, osteomyelitis, pyæmia, traumatic fever, erysipelas, gangrene, phlegmon, malignant œdema, charbon, tuberculosis, glanders, typhoid fever, relapsing fever, smallpox, cowpox, sheeppox, measles, malaria, diphtheria, leprosy, syphilis, milk fever, gonorrhœa, and gonorrhœal conjunctivitis, trachoma, croupous pneumonia, endocarditis, sympathetic ophthalmia, whooping-cough, rhinoscleroma, pterygium, rhus-poisoning, and other less known conditions. J. T.

ART. XXV.—*De l'Excision du Goître Parenchymateux.* Par Le docteur PAUL LIEBRECHT, Assistant à l'Université de Liège, Ext. du Bulletin de l'Académie Royale de Médecine de Belgique; 3e Sér., t. xviii., No. 3. 8vo. pp. 270. Bruxelles: H. Manceaux, 1883.
The Excision of Parenchymatous Goitre. By Dr. PAUL LIEBRECHT, etc.

No one who has not undertaken a work like this can appreciate correctly the immense amount of labour it represents, or approach the criticism of it with the degree of sympathy it demands. About 350 cases of operation for removal of the diseased thyroid gland have been collected, analyzed, and compared; the details of many have been reproduced; the history of the operation has been studied; its theoretical and practical merits have been carefully weighed, and certain conclusions—the outcome of all this research—are stated for the benefit of those who have not the time or opportunity to go over all the ground for themselves. These conclusions are only in part drawn from what the author has reproduced. They have been forced upon his mind by countless details, only a certain proportion of which could possibly be included in his book. For this reason, and more assuredly because no large number of readers are likely to have the patience to go through even what he has recorded, it is hardly to be expected that his views will soon be fully accepted. Nevertheless, they will undoubtedly secure respectful attention, and his unwearying devotion to his subject will not go unrewarded.

His preliminary remarks indicate the thoroughness of his research, and show that he appreciates one of its greatest merits—that of furnishing a repertorium, where other authors may find the facts necessary to the formation of an individual judgment. With this in view, he has noted, as far as possible, in each report: the sex and age of the patient; the date of operation; the description of the goitre; the accidents to which it gave rise and the indication for operation; the details of the operation; the results of the operation; the final issue; other unclassified points; the name of the operator, and the source from which his account is drawn.

The reports are classified according to the nationality of each operator: the German, Austrian, and Swiss being put together and amounting to 226; the French amounting to 34; the English to 30; the American to 16; the Italian to 10; the Prussian to 3; the Swedish to 1; and the Belgian to 2—a total of 322 operations. Of these 250 were cured, 64 died, 2 were not completed, and in 5 the result is uncertain. He adds, without details, 29 cases of Billroth's and 5 of Chelius's—29 cured and 5 ending fatally, which gives in all a total of 356 with a mortality of 69, or 19.39 *per cent.*

A special section is devoted to the history of the literature of goitre, going back to Hippocrates, and correcting certain errors in regard to the views and statements of some of the ancients, quoting their *ipsissima verba.* The first author to whom Dr. Liebrecht credits a report, in precise terms, of an extirpation of a goitre is Fabricius Hildanus, whose account he quotes almost in full. This operation was done upon a child by a quack after Hildanus had refused to undertake it. The child, a girl, died under the knife of the operator. In the eighteenth century the operation was performed a few times, though as late as 1794 Wichmann characterizes it as "in good German literally cutting the throat of one's patient." Even Bardeleben, as late as 1875, repudiated the operation,

while Erichsen, 1878, says the operation "is seldom to be thought of." The first surgeon in France who warmly advocated it was Michel, in 1873. In other countries it was until recently held in equally low esteem. But, at present, owing to the wonderful success of Billroth, Lücke, Bruns, Kocher, and others, it is growing into more general adoption, and in France the author speaks of it as acquiring popularity. "It is especially," he says, "since the second half of this century, and more particularly since a dozen years, that thyroidectomy has conquered an established position among legitimate surgical operations. Actually the number of known total extirpations exceeds 400, of which the great majority have been crowned with success." This change he compares with the history of ovariotomy, and claims that, equally with the latter operation, the excision of a goitre is demanded whenever not specially contraindicated.

Following this the author devotes a section to the descriptive and topographical anatomy of the thyroid gland and of goitre. Next he takes up its pathological anatomy and its influence on neighbouring organs. Next come the indications and contraindications for the operation, naturally attributing great weight to Billroth's opinions. His own conclusions he formulates as follows:—

"One *should* operate: when other means have failed and if the accidents have acquired gravity, or when one can foresee that they will acquire it at a given period. The last result can be anticipated when there is a continual increase of the goitre. One *may* operate: to get rid of a deformity, either for æsthetic reasons or when it constitutes for the patient an obstacle to his occupation or his social relations; or, in fine, when the tumour, without determining accidents, properly so called, is the cause of annoyance or inconvenience to the patient."

He makes a point of the danger of delaying the operation, and cites the valuable paper of Kocher on the Indications for the Extirpation of Goitre in the Present Position of Antisepsis, published in the *Correspondenzblatt f. Schweizer Aerzte*, 1878, No. 23, to bear him out in his opinions. He admits only one absolute contraindication—atheromatous degeneration of the arteries.

As to total or partial excision, the statistics are slightly in favour of the former; and he would limit partial excision to goitres clearly pediculated or circumscribed and isolable from the surrounding tissues. Above all, one must not leave behind any diseased tissue, for fear of recurrence.

The method of operating described includes mixed anæsthesia and antiseptic dressings—the spray Liebrecht considers superfluous. Every detail of the operation is described most carefully, and with the greatest particularity, and the method of Baumgärtner (*Centralblatt f. Chirurgie*, 1881, No. 3), for the control of hemorrhage, strongly recommended. This method consists in dissecting the tumour out, seizing each bloodvessel or fibrous band as encountered with two "*pinces hémostatiques*," and dividing between these, leaving both in place. When the tumour is removed the hemostatic forceps are taken off one by one. Many will be found to contain no bloodvessels, or such small ones that they do not bleed after the pressure they have had. When a vessel does bleed it is to be carefully isolated, and ligated. For ligatures the author prefers good catgut, hardened in chromic acid—as Lister recommends—and advises cutting the ends off and closing the knot up in the wound.

Preliminary tracheotomy does not appear to be approved by facts, and it certainly is not recommended, unless in exceptional cases, by the most distinguished and successful operators.

The author advises the use of Lister's antiseptic dressings after the operation.

The consideration of the sequelæ of thyroidectomy leads to some most interesting statements in regard to the wounding of nerves. The nerves which may be injured are the pneumogastric, the inferior laryngeal, and the great sympathetic. The first accident has never been observed in this operation. But, even if it should, Liebrecht thinks it would not necessarily entail unfortunate consequences. He cites a number of cases where portions of the pneumogastric have been removed, in other operations, without any ill effect whatever. Injury of the recurrent laryngeal nerves by ligature or by section has occurred a number of times, followed by impairment of phonation and deglutition, and even by bronchial inflammation and tetanus. Whether the two latter sequences were consequences or not does not appear clear, but it is doubtful that they were. The voice alterations have usually passed off in a few weeks. The difficulty in swallowing occurred in a bad case of Billroth's, and amounted to an impossibility, the patient dying collapsed in forty-eight hours. Here, again, it is doubtful that the ligation of the recurrent nerve with the inferior thyroid artery was the cause of the trouble: first, because of the nature of the case, and second, because, if it were, similar effects ought to have been observed in some of the other cases where a similar accident happened.

As to the remote effects of excision of the thyroid, the author cites an interesting communication of Kocher to the Berlin Congress, in which he claims that there are few cases of operation in which general disturbances do not follow. These troubles become more pronounced as time goes on. They consist in dulness, lassitude, and progressive pernicious anæmia—what Kocher calls the "goitrous cachexia." This assertion of Kocher's was denied by Bardeleben and Wölfler—the latter of whom speaks, in a sense, for Billroth. Liebrecht does not commit himself as to the facts, but calls attention to their influence upon the whole question of total extirpation.

In conclusion, the author analyzes his statistics to show the results of the operation and the causes that have militated against its success. This leads him to the statement that only about $8\frac{3}{4}$ *per cent.* of the deaths are fairly attributable to inevitable causes, and that the excision of parenchymatous goitre has taken its place in surgical practice, and will shortly be done under conditions similar to those affecting the removal of every other kind of tumours.

The last pages of the book contain a full and useful bibliography of the subject, and a table of contents.

From this brief epitome it may be seen how valuable a contribution to surgical literature we have here. Instead of the arbitrary opinion of a single operator, we have a collection of facts, to the proper estimation of which the compiler's analysis and conclusion offer most useful assistance. As far as we can judge, these conclusions are fully justified by the facts cited, and it makes little matter that they are opposed to the opinion of some surgeons whom the whole world holds in deserved respect. The mountain will not come to Mahomet—Mahomet must come to the mountain.

C. W. D.

ART. XXVI.—*Health Reports.*

1. *First Annual Report of the Board of Health of the State of New Hampshire for the year ending April* 30, 1882. Concord, 1882, pp. 318.
2. *Fifth Annual Report of the Board of Health of the State of Rhode Island for* 1882. Providence, 1883. Pamphlet, pp. 327.
3. *First Report of the State Board of Health of Arkansas from April,* 1881, *to Dec.* 1882. Little Rock, 1883. Pamphlet, pp. 181.

1. THE *New Hampshire* Report, being the first after the establishment of the Board of Health, deals chiefly with the mode of organization and of preliminary work, although here, as elsewhere in so many parts of the United States, has been found an unwelcome opportunity for practical effort in battling against the spread of smallpox. A suitable bulk is given to the volume by essays furnished by various members of the board and others, which, without contributing any important additions to the science of hygiene, are valuable to the inhabitants of the State, not only as applying general sanitary rules to special local conditions, but also as aiding in the dissemination of knowledge respecting those great principles which regulate systematic care of the health.

From the secretary's report we find that the board is composed of three physicians, one civil engineer, the governor, and the attorney-general, these last two being *ex officio* members. As usual, the secretary is paid a salary, but the other gentlemen receive no compensation, although their actual expenses whilst on duty are allowed. The total sum appropriated to the board is limited to $3000 annually.

Efforts to obstruct the development of local or general smallpox epidemics, especially by the liberal employment of vaccination, appear to have met with highly gratifying success, several instances being recorded in which the outbreak was restricted to the single individual first attacked. In one case, imported from New York, the young man was supposed to be suffering from chicken-pox, and isolation, etc. being therefore neglected, he contrived to infect, directly and indirectly, thirty-eight persons, giving rise to thirteen cases of smallpox, of whom eight died, and twenty-five cases of varioloid, all of which recovered. The secretary also urges, ably and forcibly, the importance of providing against typhoid fever from contaminated water-supply, and suggests some valuable cautions in regard to diphtheria, the sanitation of seaside resorts, the use of impure ice, and other kindred topics.

After an essay on Vaccination, by Professor C. A. Lindsley, M.D., of Yale College, which is borrowed from the Report of the Connecticut State Board of Health for last year, appears a useful article upon Ventilation, by Dr. G. P. Conn, of Concord, President of the Board, in which is justly argued the superior importance of plentifully supplying fresh air to dwellings in the colder latitudes. Several of the wood-cuts with which this paper is illustrated appear to have been loaned (doubtless not unwillingly) by the manufacturer of a ventilating grate, which is highly praised. Next follows a paper upon *Suburban School-Houses*, by Warren R. Briggs, architect, of Bridgeport, Conn., which is illustrated by eleven plans, pointing out some of the best methods of avoiding those defects of sanitary construction which are unfortunately too common in such edifices, and tend, even in the schoolmaster's paradise of New England, sadly to counterbal-

ance the benefits of popular education, by sowing the seeds of physical weakness and degeneracy among the youth of America.

Water Pollution, Public and Private, is the title of an excellent paper from the scholarly pen of Dr. A. H. Crosby, of Concord, and although a little imperfect, it is complete enough to save a vast amount of human suffering and death if its practical suggestions were heeded by those to whom it is addressed.

The Registration report, showing the number of births, marriages, and deaths in the different counties, and an appendix containing the more important laws of the State bearing upon sanitation, conclude the volume, which, as the first attempt of a newly-organized board of health, is highly creditable, and gives promise of a good degree of future usefulness.

2. The diligent secretary of the *Rhode Island* State Board of Health appears to have taken a lion's share of the work in preparing the report, more than three-fourths of the volume being made up of his contributions.

From this document it appears that no great emergency requiring special meetings of the board has arisen during the year, and the only important communications received by it were, one in regard to smallpox at Newport, and another respecting the unsanitary condition of the State House at Providence. Much regret was felt over the failure of Congress to supply means to the National Board of Health to pursue its great investigation into the nature of the malarial poison, which the State Board had already prepared the way for, and proposed to aid, as an inquiry likely to benefit very largely the inhabitants of the United States. On account of the parsimonious allowance to the board (only three hundred dollars annually is appropriated by the Rhode Island Legislature), no original investigations could be undertaken, but sundry popular articles upon sanitary subjects were published by the secretary as aids towards forming correct public opinion upon these important matters.

According to the registration report, there were, during the year 1881, in a population of 276,531, 6761 births (more than ever before recorded), 2750 marriages, and 5016 deaths; the death-rate of the last five years is given at the low figure of 17.2 per 1000. From the summary of the death register we find that more than one-quarter of all the deaths which occur in Rhode Island are caused by diseases of the lungs and respiratory passages. Consumption is the most fatal malady, and pneumonia stands next, being followed by cardiac disorders and old age, to which 247 deaths are attributed. Scarlatina, which stood second on the list in 1880, had, in 1881, dropped to the twelfth place.

A praiseworthy effort to obtain statistics in regard to the prevalence and severity of the more common acute diseases, has not, we regret to observe, met with all the success it merited, only about thirty towns furnishing the desired accounts. Full annual reports from the numerous medical correspondents of the board in various parts of the State are given, but in the absence of any complete tabulated statement of the results afford information of local value only.

The paper by Edwin E. Calder, on the *Composition and Properties of milk*, is an exhaustive compilation of the main facts in regard to this important article of food, but it is chiefly valuable to an experienced sanitarian as narrating the author's own experience as milk analyst of the city of Providence. After a five years' term of service, in which the lactometer was applied to the testing of thousands of samples, he declares that, taken in connection with the taste, smell, colour, and general appearance of the

fluid, this instrument cannot fail to be of great service in examining the milk from any dairy, or the supply of any large city, also that in no instance have its readings caused any injustice to the milk-dealer. A supplementary chemical analysis is often necessary to determine the percentage composition in essential constituents and for the detection of foreign substances. This analysis, however, rarely requires to be complete, the determination of the total solids, fats, solids not fat, and the amount and nature of the ash, being generally sufficient. One shrewd provision of the State law, which we would like to see enforced in our own city against these Herods of the nineteenth century, is that any milkman convicted of selling impure milk shall have his name and place of business "published in two newspapers printed in the town, or county, where the offence has been committed."

The other essay, on *Parks and Open Spaces in Cities*, by T. C. Clark, M.D., of Providence, is a brief, but earnest plea in favour of these popular breathing-places, which do so much to reduce the sick and death-rate among the children of the poor.

3. The *Arkansas* State Board of Health Report covers a period of nearly two years from its establishment in April, 1881, to December, 1882, and records the struggles of a beneficent organization to be of use to a people who seem to be scarcely educated up to the degree of appreciating the infinite hygienic advantages which it would secure if properly sustained by the community. Some idea may be gained of the difficulties which are encountered by sanitary authorities among ignorant and prejudiced persons from the statement that the Local Board of Health of Little Rock—

"During the early part of the year 1881, was doing good work in cleansing the city. But the visits of the Sanitary Inspectors to the premises of the Mayor and several of the Aldermen were regarded as infringements of their personal rights; and the indignation of the town Council was manifested in the repeal of the health ordinances sanctioning such invasions, and in abolishing the Board of Health. As a consequence, filth everywhere accumulated in disease-spreading abundance. Ordinary diseases assumed aggravated forms, and did not respond to treatment; sickness was general, and the mortality was nearly, if not quite, double that of any period of like duration in the city's history."

As is apt to be the case in new civilizations, the most effectual work of the State Board of Health was accomplished in the presence of contagious diseases, particularly of smallpox, when the popular dread of a threatened epidemic swayed public opinion strongly in favour of the sanitary officials. Several examples of the beneficial effects of prompt isolation and vaccination in preventing the spreading of variola are reported, as, for instance, the cases at Little Rock, seventeen of which were recorded, four in vaccinated patients with one death, and thirteen among unvaccinated persons with nine deaths, a mortality of over two-thirds. In one of these series of instances, the infection was believed to have been introduced by some discarded underclothing, picked up and washed by the first person attacked, who was a servant in the hotel where it broke out. On another occasion, smallpox broke out among the passengers in a box-car upon the Memphis and Little Rock Railroad. As neither of the towns between which it was discovered would consent to receive the cases, the main track was cut, the box-car containing the five cases side-tracked, and a physician, medicines, and supplies being furnished by the railroad company, the patients were cared for in this unusual way, along with two cases which afterwards

appeared in one of the neighbouring towns, without further extension of the malady.

With every disposition to make liberal allowances for imperfections in the work of a newly formed Board of Health, the operations of which have been carried on in spite of such discouraging obstacles as those already alluded to, we must deprecate the careless proof-reading in future Reports which would represent the presiding officer as promulgating such astounding declarations as the following, on p. 49, "Hygiene or public health is that condition of body, supported by physical causes, such as air, water, and food." Nearly half of the volume is taken up with a reprint of Dr. Gihon's very able and important report on the prevention of venereal diseases made to the American Public Health Association, at its New Orleans meeting; with the Meteorological Report prepared by W. U. Simons, of the U. S., a signal corps stationed at Little Rock; and with the mortuary report of Little Rock, showing a death-rate of nearly 40 per 1000 in a population of a little over thirteen thousand as given by the U. S. census of 1880; although in fairness we should mention that local authorities consider this figure too low, and place the number of inhabitants at about 18,000, which would reduce the rate of death to 29 per thousand annually.

J. G. R.

ART. XXVII.—*Excision of the Knee-Joint, with Report of Twenty-Eight Cases.* Illustrated by thirteen Photo-Lithographs and Wood Engravings. By GEORGE EDGEWORTH FENWICK, M.D., C.M., etc. 8vo. pp. 68. Montreal: Dawson Bros., 1883.

IN his preface the author states that, at the request of friends, he has "thrown together a few observations on the subject of excision of the knee-joint, principally with the object of placing on record the statistics of the Montreal General Hospital in reference to that operation." He further states that he has brought prominently forward a method of section of the bones, to which he attributes much of his success. This method was given to the profession in the pages of the *Canada Medical Journal* some sixteen years ago; but it has not attracted the attention which it merits. Justified by his own success, he again urges its adoption. It has the peculiarity of including a removal of the opposite bone surfaces in a curvilinear manner; so that, when the shafts are brought into apposition, the newly made convexity of one—the femur—shall fit into a corresponding concavity of the other—the tibia.

This practical suggestion, which the author deems the most important of those he makes, is accompanied, however, by others, occurring incidentally, which add materially to the value of his *brochure*. Among these may be set down the emphasizing of the need for personal supervision of the after-treatment by the surgeon himself. As the author remarks, "A little trouble and attention in this respect will amply repay the surgeon." This truth is not limited to operations on the knee-joint.

The book opens with an argument, which is scarcely needed nowadays, in favour of the operation of excision *per se*. But the author does not lay down clearly the cases to which he believes the operation to be specially applicable, though he undertakes to do so; and one is compelled to

gather from the cases he reports that any chronic condition which interferes with the use of the joint, as a joint, even though it cause but little pain, justifies it in his opinion. It would almost seem as if his zeal for the operation had led him at times to operate when others would have hesitated; yet the results obtained appear to have been satisfactory to him and to his patients, and they would certainly be better judges than one at a distance.

In the course of his remarks, the author takes occasion to express his disbelief in the theory which would attribute joint disease to extravasation of blood into the cancellated tissue beneath the cartilage, relegating the cause rather vaguely to sudden strains, twists, blows, wounds, and cold, causing inflammation of the synovial membrane and subsequent destruction of cartilage and involvement of bone.

But, when we come to what the author sets before him as his real object, namely, describing a method of operating, we find him clear and full enough in his statements. The method he advocates may be epitomized as follows: An incision is made from the back of one condyle to the back of the other, going below the patella, and dividing its ligament and the lateral ligaments, after which the crucial ligaments are divided. Next the articular surface of the femur is removed in such a manner as to leave a semi-cylindrical end convex from before backward, and the articular end of the tibia so as to present a corresponding semi-cylindrical concavity. This the author does with a fine fret-work saw fitted to a Butcher's frame. The condyles must be reduced to an equal extent, so as to preserve their proper relations. The two ends must then be accurately adjusted. The epiphyseal line is not to be disturbed, if it can possibly be avoided. The hamstring tendons are to be let alone, unless they prevent putting the bone in proper position. The patella is to be removed with its fibrous investment. Hemorrhage is next to be checked, and suitable dressings applied. The apparatus recommended is that of Dr. Patrick Heron Watson, of Edinburgh, consisting of a rod of iron extending from the groin to the toes, bent at the ankle to follow the line of the foot, and at the knee so as to arch well above it. Dr. Fenwick has added two tin plates, one to embrace partly the thigh, and one to do the same to the upper part of the leg, so as to prevent twisting. The bar has either one ring or two, by which it can be swung. The lower part of the fixation apparatus consists of a Gooch's splint, made to partly embrace the limb, and leave the knee almost entirely free. The apparatus is applied with a paraffine bandage before the wound is closed, and then this is done after the method of Lister, the dressing being made to include the lower splint, but passing below the arch in the rod above.

A second part of Dr. Fenwick's book contains detailed accounts of ten cases, illustrated by nine photographs. The accounts are interesting, and the pictures are admirable in their execution, giving the impression of most favourable results in the author's operations.

Finally, there is a table of twenty-eight cases—twenty-one by Dr. Fenwick—with only one death. Comparing Dr. Fenwick's operations with those published by other surgeons, they appear to have been more successful, not only as to the mortality, but also as to the results obtained. (In the body of his book (p. 13) Dr. Fenwick says there were two deaths in twenty-eight cases, "only one of which can be ascribed as due to the operation." The table, as just stated, gives but one death. It also classes one result as doubtful, and includes two cases where amputation had to be performed.)

So much for the matter of this book. The style is loose and unmethodical, the punctuation is sometimes very bad, and the language and construction trying to the reader. There are a number of rather serious errors of date, corrected in a slip of errata, and the very title-page contains a misprint by which lithograph becomes "lithograhs". These faults are not of great consequence as compared with the instructiveness of the author's matter; but they ought to be corrected if the book comes to a second edition. C. W. D.

Art. XXVIII.—*Types of Insanity: An Illustrated Guide in the Physical Diagnosis of Mental Disease.* By ALLEN MCLANE HAMILTON, M.D., one of the Consulting Physicians to the Insane Hospitals of New York City, etc. New York: Wm. Wood & Co., 1883.

THE photographs from La Salpêtrière, found in the works of Charcot, Bourneville, and Regnaud, and others of the French school, have done so much towards making the fame of these authors, that we have wondered sometimes that the same comparatively easy method of spreading information and acquiring reputation had not been more resorted to in other countries than France. Dr. Hamilton has here utilized the method in some studies of insanity. The plates were drawn from instantaneous photographs, and the work has been admirably done. The subjects were selected from many hundreds of patients, and are typical. The forms of mental disease illustrated by the plates are idiocy, imbecility, melancholia attonita, chronic melancholia, subacute mania, chronic mania, dementia, and general paresis

Certain acute affections of the ear, and the condition of the teeth in the insane, are also shown in the last plate. In Fig. 6 of this plate, referred to as syphilitic teeth, serrated and irregular lower teeth are represented. Hutchinson's view, if we remember aright, was that only the condition of the upper incisors was indicative of syphilis. The whole doctrine of syphilitic teeth is doubtful. Notched, serrated, and irregular teeth of various kinds probably represent mal-nutrition and arrested development from various causes.

Descriptive text accompanies the illustrations, and an abstract of the laws of various States with reference to the commitment of the insane is added.

The work is an interesting contribution to psychiatry. C. K. M.

ART. XXIX.—*On the Treatment of Wounds and Fractures: Clinical Lectures.* By SAMPSON GAMGEE, F.R.S.E., etc. Second edition, 8vo., pp. ix., 364. With 44 engravings on wood. Philadelphia: P. Blakiston, Son & Co., 1883.

IT is now so many years since Mr. Gamgee first enunciated his views in regard to the principles most conducive to repair of surgical injuries,

that the mention of his name suggests at once the thought of his formula, "rest, compression, dry and infrequent dressings." For this reason, on taking up a book by him with such a title as is given above, one might expect to find it simply an argument for his peculiar views, enforced by illustrations drawn from his own experience. Such, indeed, in a sense, the book is; but it is much more. The principles of the author in regard to surgical dressings infuse it everywhere, but everywhere it is full of instructive and suggestive ideas, the value of which is intrinsic, and a clear surplusage to whatever may be the value of the more proper line of discussion.

The present volume is a consolidation of one *On the Treatment of Fractures*, published in 1871, and one *On the Treatment of Wounds*, published in 1878; a consolidation in which some recasting has taken place, and the whole completed by the addition of a section giving plain and practical directions how to carry out the method which the author advocates. Its form is what its title would lead one to expect, but it is systematic and loses nothing by its colloquial style. It opens with a chapter on the general analogy between wounds of the soft and those of the hard tissues—wounds and fractures, as the author puts it. In this, illustrations of the treatment of simple, compound, and complicated fractures are set side by side with illustrations of the treatment of contusions, simple incised wounds, gunshot and splinter wounds, and the removal of benign and inflamed tumours. The course and issue of these cases are compared in order to show their analogies. Here, at once, we come upon some of those side-lights referred to, which help to explain Mr. Gamgee's success as a surgeon. Attention to details is commended, not in a perfunctory, but apparently in a very sincere way. The injunctions in regard to the application and removal of adhesive plasters, for example, though by no means novel, somehow give the impression that the author means them, and that it would not be safe for a dresser in his hospital to do what we have seen done elsewhere, viz., put a sticking plaster dressing for fractured clavicle over a very hairy chest, and afterward rip it off as if the patient's skin had no more feeling than that of a hair trunk. And though it is not a discovery of Mr. Gamgee that patient attention and gentleness are not only conducive to the comfort of the patient, but also to the success of the surgeon, it is a truth that might be more widely known and practised upon than it is.

The second chapter treats of the arrest of hemorrhage. Many ligatures are not commended, but only the fewest number possible, together with torsion, pinching, and the use of styptic colloid, dry compression and position. Acupressure is recommended for suitable cases, and Mr. Bryant's experience with torsion—"Up to 1874, 200 consecutive cases of amputation of the leg, thigh, arm, and forearm, in which all the arteries were twisted (110 of them having been of the femoral artery), and no case of secondary hemorrhage"—is cited in favour of this method. Nevertheless, it does not appear that Mr. Gamgee has acquired confidence enough in it to adopt it for closing large arteries.

The third lecture is on sprains, and presents the merits of immobilization, compression, and position in their treatment.

The fourth, fifth, and sixth lectures are on fractures of various kinds. In these no principles are laid down different from those of general acceptation, except that more stress is laid on gentle but firm compression than is usual; and the author emphasizes the fact that provisional callus

is an accident of and not essential to union of a broken bone. The cases which illustrate this part of the book show how successfully the author's principles may be used in cases apparently most unpromising. At the same time he candidly mentions instances where they did not succeed, and where other measures for the reunion of obstinate fracture had to be adopted. In regard to details, we note the author's advice that blebs forming under dressings should not be opened, but simply included in the cotton-wool dressing, and left to take care of themselves. Incidentally we are told that Mr. Gamgee relies, for the treatment of delirium tremens, upon twenty-grain doses of bromide of potassium and forty-drop doses of tincture of digitalis, repeated as frequently as necessary and as permitted by the general strength. Antimony, in doses of half a grain to a grain every three or four hours, he thinks also very valuable. He is opposed to the plan of treating fractures with much swelling by waiting till this has declined before applying an apparatus. Here he thinks his principle of moderate compression is peculiarly indicated.

We have used the word "moderate" just now in order to prevent the possibility of a misunderstanding which it seems there have been people stupid enough to entertain. For Mr. Gamgee has to stoop to answer a reviewer, who sagely remarked, *à propos* of this, that he would "shrink from applying powerful constriction to an entire limb in which any considerable amount of true inflammatory swelling was taking place." This of one who says :—

"Pad the whole limb evenly, immobilize with accurately fitting moulds, apply these soft bandages, with lightness at each turn, and rely for firmness on equally distributed pressure and repeated intersecting spirals. Pay especial attention to physiological position, and hold pain in reverential awe. Never look upon pain as a sentimental evil, but as an expression of organic mischief. Patients with fractures when properly treated are in comfort, and if they are not it is your duty to find out the cause and remedy it."

Mr. Gamgee justly exclaims against the much more real dangers of the ordinary splints and other apparatus, those heavy, ungainly, hot, and painful loads with which many patients are burdened.

In the chapter which treats of compound fractures, the same method, comprising cotton padding, regulated compression, and a moulded apparatus, is recommended, and some astonishing cases are cited to prove its efficiency. The same may be said of amputation after crushing injuries. In which connection a warning against being too ready to amputate is given, and the famous case of Percival Pott, who came near having his leg cut off unnecessarily, is cited.

The seventh lecture treats of wounds into joints, in regard to which the first caution is one, by no means uncalled for, against excessive diagnostic inquisitiveness. The treatment recommended is closure—by sutures if necessary—dry dressing, moderate compression, and immobilization. Where inflammatory action has already begun the introduction of a drainage-tube may be required.

In the eighth lecture there is some explanation and illustration of the philosophy of the method Mr. Gamgee advocates. Accurate and immovable coaptation of divided surfaces is said to be the essential thing; infrequent dressing is but a corollary of the principle of absolute rest. That these are not novel truths is shown by references to older writers and surgeons, who, without formulating their views just as Mr. Gamgee does his, were guided in their practice by the same principles.

In the ninth lecture the general applicability of dry and absorbent dressings is dwelt upon, and the unwise use of poultices and water dressings is deprecated.

The tenth lecture is devoted to drainage and mode of suspension. Drainage-tubes, the author reminds us, were suggested to Chassaignac by observing the way farmers drain boggy land with earthenware pipes. He gives excellent instructions as to the way they should be used, and remarks on the assistance they may receive from position. Suspension, as a means of securing the advantage of position and of allowing motion without disturbance of fragments or cut surfaces, is described and illustrated with some very good cuts.

The eleventh lecture treats of wounds of the scalp and skull. In regard to these the advice given is to avoid interference as much as possible. A number of apparently desperate cases of depressed fracture are cited where recovery followed upon the use of dry dressings with ice. Mr. Gamgee inclines to the opinion, which he begs may be accepted "with much reservation," that in compound and depressed fracture of the skull, without brain symptoms, the trephine should not, as a rule, be used. If constitutional or local symptoms warrant the belief that blood or pus is collected under the meninges, or that a fragment of bone is pressing upon the seat of injury, he thinks the use of the trephine "may be justifiable." He appropriately remarks that on this question some of the greatest surgeons have been arrayed on opposite sides; and adds that the subject is one in which disinclination to dogmatize grows with experience. He quotes and cites a large number of surgeons to show the superiority of non-interference, and calls attention to the singular fact, that while the English and Americans are quite free with the use of the trephine, French, German and Italian surgeons rarely employ it. He then quotes a number of modern English writers and one American—Dr. Stimson (with his name misspelled)—in favour of the trephine. In conclusion, after a rather ambiguous statement of his own opinion, he gives three cases where he used the trephine in which the results were all that the most ardent advocate of interference could desire.

This subject is, as Mr. Gamgee says, one in regard to which doctors disagree. A little over a year ago it was brought before the American Surgical Association, meeting in Philadelphia (see *The Medical News*, June 10, 1882), by Dr. Moses Gunn, of Chicago, who advocated operative interference in all recent fractures with depression, whether simple or compound, even though entirely without symptoms of compression. The majority of those who discussed this proposition expressed similar opinions. There were, however, three very important opponents of these views. Dr. Hunter McGuire, of Richmond, thought that if a fracture is simple, and the amount of depression not enough to bring on symptoms of compression, the surgeon had better let it alone, and trust to the brain accommodating itself to the change. Dr. R. A. Kinloch, of Charleston, shared this view; and Dr. S. W. Gross, of Philadelphia, advocated non-interference in cases of moderate depression, except where there were evidences of irritation pointing to a depression of the internal table of the skull. In regard to one's attitude toward this question, very much appears to depend upon the temperament of each surgeon.

The twelfth and last lecture of Mr. Gamgee's book is occupied with a discussion of what has come to be called "antiseptic" surgery. The claim that its success depends upon its adaptation to the so-called germ theory

of Pasteur, is combated. The origin of this adaptation is traced back to Déclat, six years before Lister's first essay. Its results are shown to be no better than those of various other methods which take no note of "germs." The key-note of Mr. Gamgee's views is found in the paragraph: "Life and putrefaction are not correlative, but antagonistic; and in proportion as the surgeon utilizes and economizes the attributes of life, he will find himself independent of those changes which are inherent to decaying organic matter; whether it be in bagging wounds or boggy lands. *Life is the great antiseptic*" (italics ours). He has no fear of "impalpable and implacable germs," and he politely ridicules the language in which those who do fear them warn against the slightest failure to carry out all the details of "Listerism." In doing this he does not detract from the value of antiseptics; it is the formulated association of these with the "germ theory" which he deprecates. In all he is guilty of no discourtesy to Mr. Lister, in whom he recognizes a single-minded enthusiasm, combined with rare accomplishments as a chemist, a microscopist, a naturalist, and a surgeon.

The concluding part of the book before us is occupied by a chapter and an "addendum," giving practical directions in regard to the materials and apparatus recommended by Mr. Gamgee, and how to use them. Into the details of this we have not time to enter; but we may refer to it as an indispensable and exceedingly valuable addition to what has gone before it.

The book has also an index which adds to its value.

From what has been said, it will be seen that we have here a book of unusual interest. As the mere exponent of the views of an able and experienced surgeon, it would be entitled to respectful attention, but it has a still better claim in its intrinsic value. It is not only eminently instructive, but also suggestive. Its style is clear and logical, its spirit genial and attractive. Whether discussing a mooted point, or speaking of the consideration which every surgeon should have for his patient's feelings, there is constantly revealed the warm, kind heart of a polite and humane man. While writing to establish what he believes to be a great principle, the author has not despised bestowing scrupulous attention upon details often erroneously regarded as of minor importance. Many instances of this could be cited, of matters often overlooked or neglected; but we will only refer to his suggestions as to the use of collodion for obtaining pressure, which has a larger field of usefulness than is often suspected; as to the importance of having slings for the forearm so arranged as to keep the elbow at an acute angle—the hand higher than the elbow—which is constantly violated; as to the use of adhesive straps in certain injuries, to control hemorrhage; as to inquiry for and correcting of constipation; as to the significance of the appearance of discharges; as to keeping temperature charts out of sight of patients, so that they may not have the alarm which changes might cause; as to personal supervision after operations; as to the value of temporary digital compression to control pain and allay inflammation. These and the way they are put are features of the book which add to the feeling of respect for the author that of regard for the man. It is a privilege to read such a book, and a pleasure to commend it to others.

C. W. D.

ART. XXX.—*Handbook of Electro-Therapeutics.* By Dr. WILHELM ERB, Professor in the University of Leipzig. Translated by L. PUTZEL, M.D. With thirty-nine wood-cuts. 8vo. 366 pages. New York: Wm. Wood & Co., 1883.

WORKS on electro-therapeutics are becoming so numerous that it is difficult to keep pace with them. Professor Erb has long been known as a scientific worker in electro-therapy; and, in addition, has a reputation in general neurology that is almost world-wide, so that any work from his pen is sure to have merit. In the physical and physiological introduction, and in the applications of physiology to electro-diagnosis are found many evidences of the author's ability and originality. It is well known that to Professor Erb the term "degeneration reaction," and most of our exact knowledge of this reaction, are due; and in the present treatise he carefully describes and expounds this subject both with reference to typical and atypical cases.

The defects of the book are diffuseness, the recital in detail of too many cases, and claiming too much for electricity as a therapeutical agent.

Particular attention is given to the technique of electro-therapeutics. Many cases illustrating unusual beneficial effects of electricity have been brought together from periodical literature. The book will prove highly satisfactory to those desiring both a scientific and practical exposition of electro-therapeutics. C. K. M.

ART. XXXI.—*Observations on Lithotomy, Lithotrity, and the Early Detection of Stone in the Bladder; with a Description of a New Method of Tapping the Bladder.* By REGINALD HARRISON, F.R.C.S., etc. 8vo. pp. 71. London: J. & A. Churchill, 1883.

IN a review of Mr. Harrison's "Lectures on the Surgical Disorders of the Urinary Organs," which we published in January, 1882, we made the remark that "it is surprising to an American, meeting the names of Gouley, Otis, Keyes, etc., to miss that of Gross." In contrast to this, the first thing we observe, on opening the book before us, is that it is dedicated to Professor Gross, with most complimentary and respectful expressions. A short, twelve-line preface follows, and the author plunges at once *in medias res.*

Mr. Harrison's observations, he tells us, are founded upon an experience embracing no less than sixty operations of cutting and crushing. And it is especially as the result of experience, and of a manifestly careful and conscientious spirit, that these observations have a value for the surgeon. The book, indeed, is not like a text-book for students, but like a paper intended to be read before the author's associates, from which much instruction may be gathered, but in which there is nothing of the pedagogic spirit discoverable. For this reason a review of it ought to be conducted as one's remarks might be, who was called upon to speak at a meeting after such a paper had been read. Such a one might differ from the

author as to certain details, but for his essay, as a whole, he could only entertain a high respect. He might, for example, suggest that a little more exact knowledge in regard to the *technique* and merits of suprapubic lithotomy would have prevented the author from giving the impression that an incision through the perineum is a necessary or even an ordinary part of it, and he might regret that the renal origin and uric acid nucleus of most calculi should, by implication, seem to be ignored. But the remarks on the subject of lithotomy and lithotrity in general, he would acknowledge to be both instructive and suggestive.

More than two-thirds of this book are devoted to the field of lithotrity, which in Great Britain has so largely superseded lithotomy, and which has of late received so great an impetus from the adoption of the instruments and method of Prof. Bigelow. In regard to the latter, an ill-concealed allusion is made to the reluctance to recognize its merits on the part of the most distinguished advocate of the old method of lithotrity in Great Britain, and the author's own appreciation of them is most unequivocally stated.

Mr. Harrison's views in regard to the principles which should guide the surgeon in the choice of a method of operation—cutting or crushing—are conservative and judicious. So are his remarks in regard to the early detection of stone in the bladder.

The "New Method of Tapping the Bladder," mentioned in the title of this book, consists in thrusting a trochar and canula through the perineum and prostate gland. A peculiar instrument, specially adapted to the purpose, is described and figured, and the endorsement of Professor S. D. Gross—which is contained in the sixth edition of his *System of Surgery*—is given.

As remarked at the beginning of our review, this book is not a text-book, and so is not suited to the needs of the average student, but for the surgeon it is just the thing. In manner it is most pleasing—in matter it is most suggestive. C. W. D.

ART. XXXII.—*Anatomy, Descriptive and Surgical.* By HENRY GRAY, F.R.S., with the collaboration of T. HOLMES, M.A., H. V. CARTER, M.D., and T. PICKERING PICK. A new American, from the tenth English edition. To which is added *Landmarks, Medical and Surgical*, by LUTHER HOLDEN, F.R.C.S., with additions by W. W. KEEN, M.D. 8vo. pp. xxxii., 1023. Philadelphia: Henry C. Lea's Son & Co., 1883.

BUT little need be said of this book save that it is the *tenth edition.* Saying this only we say very much, for few books have such a vigorous life. The present edition has undergone careful revision, some of the sections on microscopical anatomy have been altered or entirely rewritten, and several of the illustrations have been bettered, and a few additional ones added.

Of all the many text-books on anatomy, this has been ever since its issue in 1858 *facile princeps*, and we see no reason why it should lose its rank. W. W. K.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

Primary Radicles of the Lymphatic System.

A METHOD for measuring in a satisfactory manner the primary radicles of the lymphatic system has been vainly sought for during the past three centuries. M. SAPPEY has recently read a paper before the *Académie des Sciences*, in which he states that he has discovered a method by which they can be clearly seen. His method demonstrates that the vessels of which this system is composed originate in the tissue of the organs by minute capillaries, the calibre of which does not exceed 1 mmm. ($\frac{1}{25000}$ inch), that these capillaries freely inosculate, and that at the level of their communications there exist very minute starred enlargements or swellings (lacunæ). A network of these minute capillaries and lacunæ represents the primary radicles of the lymphatic system. The chief cause of the failure to demonstrate these radicles heretofore is due to their perfect transparency. M. Sappey has succeeded in giving the capillaries and lacunæ a pale yellow colour, which enabled him to demonstrate them. This was done by filling these cavities with a quantity of the lowest order of vegetations of the lowest order of cryptogams. These microphytes, generally recognized as microbes, are sharply outlined. They differ markedly both in outline and configuration, but may be classed under two principal groups, the one having the form of rounded and brilliant cells, and belonging to the micrococcus family, the others elongated and cylindrical, belonging to the bacteria family.

If the microbes proliferate rapidly in the plasma of lymph, they grow with equal rapidity and abundance in blood serum, and if their presence is necessary for a demonstration, it is important that they should appear in the lymphatic capillaries only, and not in the blood capillaries. In order to prevent this accident he injected the blood capillaries with an acidulated liquid, sufficiently abundant to carry away their contents; in other words, he substituted for the blood plasma, a favourable medium for the development of the microphytes, a solution in which they cannot proliferate, with the result that no vestige of them could be found in the blood capillaries. The primary radicles of the lymphatic system, filled, on the contrary, with coloured cells, were alone seen in the field of the microscope, and so clearly, in fact, that they could be studied in their entirety, and as to their smaller details, and most minute variations.

Is there a communication between the primary lymphatic radicles and those of the blood capillaries? At the beginning of his studies on the absorbent vessels, M. Sappey believed it, and developed this opinion in his works. In admitting this communication and supporting it, he acted on general considerations deduced from normal and pathological anatomy; he had no observed fact to support this view. But he now declares that by a certain procedure the closest *connections* of the lymph and blood capillaries can be seen. The latter are of so large a calibre as compared with the former that they may be likened to the trunks of trees, and the lymph capillaries to climbing plants embracing all parts of the tree, the lacunæ representing the leaves of the climbing plants. When a preparation is examined at the moment of immersion in the reagent for bringing out the lacunæ, at first the blood capillary only is seen. Then, under the influence of the reagent, lacunæ appear here and there: the blood capillary gradually disappears as the lacunæ become more and more visible. During this successive appearance and disappearance of the lymph and blood capillaries, there is a moment when the observer can distinguish, at the same time, the two kinds of vessels, and in the best conditions for observing their communications if they exist. But even in these favourable conditions it has so far been impossible for him to see the slightest communication between them. From these new and concise facts, and apart from all deductions, he concludes that there is no reason for admitting an intercommunication; the lymphatic vessels are hermetically sealed. Blood plasma penetrates the primary radicles by simple transudation or by capillarity, by undergoing only slight modifications.

The histological characters of the primary radicles differ according as one considers the network of the lacunæ and minute capillaries or the subjacent network. The superficial network is composed of an *ensemble* of cavities, the walls of which have, apparently, no endothelial cells. Nitrate of silver, which acts so readily in bringing out these cells in other parts of the circulatory apparatus, has no effect on the minute capillaries and the lacunæ. Their walls are formed simply of an amorphous (structureless?) membrane. The collecting network under the preceding has a more complex texture. On the vessels composing it are seen endothelial cells easily shown by nitrate of silver. These cells form a continuous sheath which lines the internal surface of the proper or structureless membrane. The wall of the sub-papillæ vessels or collectors is composed, then, of two layers. As to the existence of a muscular structure in these two layers, M. Sappey cannot speak with certainty. He has not seen the slightest trace of such structure, and from a uniform failure to see it after repeated trials he thinks that he is justified in saying that no such structure exists at the origin of the lymphatic vessels nor for some distance from their origin.—*L' Union Méd.*, June 23, 1883.

—

A New Centre of Vision in the Human Eye.

For a long time M. DELBŒUF has observed that sensibility for light is greater at the periphery than at the centre of the retina. If one uses a vacillating flame, such as given by a candle, it will be seen that, though there may be but little light on the book or paper immediately before the eye, there is a dazzling, sometimes almost insupportable glare, on the other white papers on the table, seen by indirect vision. Or the reader may turn his back to the window, holding in the hand a white paper almost horizontally, and a slightly movable shadow is seen projected on the paper, the movements of the shadow being more visible if the eyes are directed to the top or the sides.

After a series of experiments on this subject M. Delbœuf draws the following conclusions:—

1. The macula lutea, of which the visual acuity is greater than that of any other part of the retina, has less sensibility for the differences of brightness.

2. The part of the retina most sensible to luminous differences is a line situated in the vertical meridian, and commencing about 30° from the macula lutea, and extending, in most of the eyes examined, as far as 60° and over, from it.

3. Beyond this line the sensibility goes on decreasing, but in such a manner that the maximum lines of each meridian enclose the macula lutea, remaining within the limits of 30°–20° of it.

4. The sensibility is, generally speaking, greater in the internal and superior demi-meridians.

5. Save personal differences, the two eyes appear to be organized symmetrically as far as this special sensibility is concerned.—*Revue Scientifique*, August 11, 1883.

—

Kymographic Measurements in Men.

Of all the methods, says Prof. E. Albert, of Vienna, which have hitherto been employed for determining the blood-pressure and obtaining true traces, the registering kymographion of Ludwig is the best and most productive of true results. Heretofore, experiments with this instrument have only been made on animals. Dr. Albert has recently, however, recorded cases in which the experiment was made on the human subject, before amputation of a limb. A disinfected canula was bound into a vessel. All the experiments were made in cases in which the thigh or the leg had to be amputated. The experiment only lasted a few minutes in most of the cases. The vessel chosen was the anterior tibial artery, on account of the ease with which it could be reached. The subject was slightly narcotized, the instrument applied, and the anæsthetic removed while the tracing was taken. In one case there was an abnormality of the heart; the tracings in this case had a special value.

The tracings taken by Prof. Albert oppose the assertions of Schapiro and Thomayer that the blood-pressure is higher in the erect than in the sitting posture. The blood-pressure was regularly increased when the epigastrium of the patient was raised. It is possible that when the upper part of the body was raised up the abdominal viscera were pressed on, and a portion of their blood sent into the right heart, by which the pressure was raised. In the erect position it may be possible, on the other hand, that so much blood is collected in the veins of the abdominal viscera and upper extremity that the aortic pressure is lowered. The blood-pressure during the passive upright position of the upper part of the body was between 10 and 20 mm. of mercury, and remained so as long as the subject was left in that position. Even a very slight elevation of the body gave a different result. In one case the pressure was raised when the subject coughed, which explains why the act of coughing may produce hæmoptysis. It may be mentioned, also, that morphine not only allayed the cough irritation, but lowered the blood-pressure. In two cases in which the other lower extremity was enveloped by an Esmarch's bandage during the experiment the blood-pressure was raised about 15 mm. As a rule there was but slight variation during the respiratory act; only in a few cases was there marked indication of the respiratory rhythm. This may be partially explained by the fact that the breathing of the patient was very quiet. This regular blood-pressure under the anæsthetic indicates that the present methods of producing narcosis are approaching perfection. Three plates are given, indicating some of the results obtained. The mean blood-pressure in six cases was between 100 and 160 mm.—*Medizin. Jahrbücher*, 1883, Hft. ii.

Physiology of the Bladder and Rectum.

The following are the physiological conclusions drawn by Mr. F. LE GROS CLARK at the close of an interesting paper on this subject:—

1. The muscular coat of the bladder acts under the government of the will, but is also subject to reflex influence.

2. The abdominal muscles take no necessary part in the expulsion of the urine.

3. In early life the action of the bladder is chiefly reflex, but is gradually rendered voluntary by education and habit.

4. The retaining power of the bladder is due (*a*) in great measure to the hydrostatic law, in accordance with which the egress of fluid from a reservoir through a small tube is determined; (*b*) to the elasticity and (?) muscularity of the urethra; (*c*) to its compression, whilst under the arch of the pubes, by the compressor urethræ muscle.

5. The annular fibres around the neck of the bladder have not a sphincter action.

6. Incontinence or retention of urine may be referred to excessive or deficient sensitiveness of bladder, ill-regulated control, atony, mechanical obstruction. When violence is inflicted on the nerve-centres—either brain or spinal cord—the bladder may be rendered partially or wholly incapable of expelling its contents. In lesion of the brain this incapacity is proportioned to the profundity of the coma, and due to insensibility and suspension of voluntary power. In compression of the cord the cause is the same, but operates by interruption of the afferent and efferent currents; and the reflex energy of the cord is also impaired.

7. The rectum is guarded at its outlet by two sphincter muscles, one cutaneous and chiefly voluntary, the other intestinal and spinal-reflex. In compression of the brain the former is almost or entirely disabled; in compression of the cord the power of the latter is likewise impaired.

8. Where an appeal is made, through common sensation, to the nerve-centres, it is not consistent with our physiological knowledge to exclude volition from participating in the origination of the motor force which is evoked by that appeal.

In the preceding pages, the nature of my subject has compelled me to assume as probable some things which do not admit of demonstrative proof; and where this is the case, I have expressed myself accordingly. But if my views are such as to satisfy physiological criticism, I may venture to claim for them the further recommendation that they afford a reasonable explanation of some of the otherwise obscure pathological phenomena presented by the excretory urinary organs. —*Journ. of Anat. and Physiol.*, July, 1883.

MATERIA MEDICA AND THERAPEUTICS.

Physiological Action of Barium Chloride.

Drs. SIDNEY RINGER and HARRINGTON SAINSBURY have recently published the results of their experiments as to the action of barium chloride on the animal organism. The question to be decided was whether barium acts directly on the tissues in which it manifests itself, or indirectly on these through the medium of the nerves?

They briefly recapitulate the steps in their argument as follows:—

1. We have the experiments of Boehm showing the systolic heart, the retarded pulse-rate, and the heightened blood-pressure, resulting from barium chloride action.

2. We find that the systolic heart and the retardation occur equally when the centres of reflex control are destroyed.

3. We find that the local application of the salt, in diluted solution, to the heart *in situ*, produces local spasm at the point of application; and also that the excised heart is arrested in full systole by the drug.

4. We find that the vessels freed from central nervous control respond to the direct action of the salt.

5. We find that we are unable to influence the calibre of the vessels through the nerves apart from direct local action.

We here see that the action on the heart is a guide to the action on the arterioles, or *vice versâ*, and this we should feel inclined to expect: since, on tissues resembling one another, we should look for a resemblance of effects. This question will be gone into more fully in a paper shortly to be published, on the digitalis group generally, in respect of which the experiments were conducted after the same methods described here.

To the marked resemblance in action between barium chloride and digitalis we need scarcely draw further attention. Boehm pointed it out, and it is sufficiently manifest. But of the alternative which he gave us for barium chloride action, viz., either action on the whole sympathetic system, or on unstriped muscular tissue generally and specifically, we must choose the latter.

The therapeutic value of barium chloride yet remains to be determined; the drug is clearly a very powerful one, and in this respect is widely separated from its chemical analogue calcium chloride. As to the directions in which clinical observation should extend, we get a clear indication from the digitalis-like action of the drug.—*British Med. Journ.*, August 11, 1883.

—

Action of Saline Cathartics.

Mr. Matthew Hay, of Edinburgh, at the close of a long and exhaustive article on this subject, draws the following conclusions:—

1. A saline purgative always excites more or less secretion from the alimentary canal, depending on the amount of the salt and the strength of its solution, and varying with the nature of the salt.

2. The excito-secretory action of the salt is probably due to the bitterness as well as to the irritant and specific properties of the salt, and not to osmosis.

3. The low diffusibility of the salt impedes the absorption of the secreted fluid.

4. Between stimulated secretion on the one hand, and impeded absorption on the other, there is an accumulation of fluid in the canal.

5. The accumulated fluid, partly from ordinary dynamical laws, partly from a gentle stimulation of the peristaltic movements excited by distension, reaches the rectum and produces purgation.

6. Purgation will not ensue if water be withheld from the diet for one or two days previous to the administration of the salt in a concentrated form.

7. The absence of purgation is not due to the want of water in the alimentary canal, but to its deficiency in the blood.

8. Under ordinary conditions, with an unrestricted supply of water, the maximum amount of fluid accumulated within the canal corresponds very nearly to the quantity of water required to form a 5 or 6 per cent. solution of the amount of salt administered.

9. If, therefore, a solution of this strength be given, it does not increase in bulk.

10. If a solution of greater strength be administered, it rapidly increases in volume until the maximum is attained. This it accomplishes in the case of a 20 per cent. solution in from one to one and a half hours.

11. After the maximum has been reached, the fluid begins gradually and slowly to diminish in quantity.

12. *Cæteris paribus*, the weaker, or in other words, the more voluminous the solution of the salt administered is, the more quickly is the maximum within the canal reached; and accordingly purgation follows with greater rapidity.

13. Unless the solution of the salt is more concentrated than 10 per cent. it excites little or no secretion in the stomach.

14. The salt is absorbed with extreme slowness by the stomach of the cat.

15. The salt excites an active secretion in the intestines, and probably for the most part in the small intestine, all portions of this viscus being capable of yielding the secretion in almost equal quantities.

16. The bile and pancreatic juice participate but very little in the secretion.

17. The secretion is probably a true *succus entericus*, resembling the secretion obtained by Moreau after division of the mesenteric nerves.

18. The secretion is promoted by local irritation of the intestine, as by ligatures, but only in the immediate vicinity of the irritation.

19. Absorption by the intestine generally is reflexly stimulated by such irritation (the effect of numerous ligatures applied at points remote from the seat of the injected salt being to diminish the amount of purgative fluid by accelerated absorption).

20. If the salt solution be injected directly into the small intestine, the stronger within certain limits the solution is, the greater will be the accumulation of fluid within the intestine.

21. This difference is not observed when the salt is administered *per orem*, as the strong solution becomes diluted in the stomach and duodenum before passing into the intestine generally.

22. The difference is due to the local action of the salt on the mucous membrane, and probably more to an impeded absorption than to a stimulated secretion.

23. When the salt is administered in the usual manner, it appears, in the case of the sulphate of magnesia and sulphate of soda, to become split up in the small intestine, the acid being more rapidly absorbed than the base.

24. A portion of the absorbed acid shortly afterwards returns to the intestines.

25. After the maximum of excretion of the acid has been reached, the salt begins very slowly and gradually to disappear by absorption, which is checked only by the occurrence of purgation.

26. During the alternations of absorption and secretion of the acid, it is the salt left within the intestine which excites secretion, the absorbed and excreted acid exerting no such action whilst in the blood, or during the process of its excretion, as Headland believed.

27. The salt does not purge when injected into the blood, and excites no intestinal secretion.

28. Nor does it purge, when injected subcutaneously, unless in virtue of its causing local irritation of the abdominal subcutaneous tissue, which acts reflexly on the intestines, dilating their bloodvessels, and perhaps stimulating their muscular movements.

29. The sulphate of soda exhibits no poisonous action when injected into the circulation.

30. The sulphate of magnesia is, on the other hand, powerfully toxic when so injected, paralyzing first the respiration and afterwards the heart, and abolishing sensation or paralyzing the sensory-motor reflex centres.

31. Both salts, when administered in the usual manner, produce a gradual but well-marked increase in the tension of the pulse.

32. According as the salt-solution within the intestine increases in amount, there occurs a corresponding diminution of the fluids of the blood.

33. The blood recoups itself in a short time by absorbing from the tissues a nearly equal quantity of their fluids.

34. The salt, after some hours, causes diuresis, and with it a second concentration of the blood, which continues so long as the diuresis is active.

35. As the intestinal secretion excited by the salt contains a very small proportion of organic matter as compared with the inorganic matter, the purgative removes more of the latter than the former from the blood. In certain cases a large quantity of the salts of the blood is thus evacuated.

36. The amount of the normal constituents of the urine is not affected by the salt.

37. After the administration of sulphate of magnesia much more of the acid than of the base is excreted in the urine.

38. The salt has no specific action in lowering the internal temperature of the body, or has it only to a very small extent.

39. It reduces, however, the absolute amount of heat in the body.—*Journal of Anat. and Physiol.*, July, 1883.

—

Action of Piperidin.

Fliess, in an article in a recent number of the *Archiv für Anat. und Physiol.*, gives the results of some researches he has made on this substance. He finds that if a dose of piperidin be subcutaneously injected into a frog, after a short period of unrest the animal remains remarkably quiet, and no longer moves when the foot is pinched, and that this is not due to lesion of the muscles or to paralysis of the motor nerves is shown by the vigorous movements that are made if the sciatic nerve be stimulated by an induced current. Paralysis of the sensory nerves must, therefore, be the cause of the lack of response of the animal to sensory stimuli, and the question arises whether it is the nerve or the centre that is paralyzed. The loss of reflex excitability takes place about ten or twelve minutes after the injection of one milligramme of piperidin, and is so complete that even its contact with the eye fails to elicit any response. Recovery of the sensibility occurs at the expiration of twenty-four hours. It has been rendered probable by Kronecker's and Sterling's experiments that a single shock is insufficient to excite a reflex action, and that at least two are required, which must be separated by a short interval only. In his experiments with piperidin, however, Fliess found that the time which elapsed between two shocks in order that a reflex movement should be induced was not altered, but only that the shocks must be much stronger. Hence he arrives at the conclusion that it is not the centre which is acted on by the piperidin, but the conducting agent—the nerve. The paralysis of the sensory nerves only occurred in those parts of the body to which the blood impregnated with piperidin was distributed; in any part of it protected from the action of such blood the sensory fibres retained their function. Further experiments demonstrated that the part of the sensory nerves on which piperidin acts is their peripheric termination. All the experiments proved that neither the muscles nor the motor nerves were in any way affected.

Other results observed after the subcutaneous injection of one milligramme of

piperidin were that the frequency of respiration fell to one-half the normal amount—that is, from 60 to 36 and 30 per minute. Large doses led to the Stokes' phenomenon, respiration being interrupted for two or four minutes, after which the frog made from three to four respirations. In regard to the cardiac beats, their number similarly fell to about two-thirds of the normal, from 54 to 34 per minute.

Fliess further made some observations on the action of piperidin on warm-blooded animals, but did not find that its effects, in the rabbit at least, were nearly so well marked, even though fatal doses were administered, and this he attributes in part to the circumstance that piperidin oxidizes with extraordinary rapidity in the body. The frequency of respiration was considerably reduced, the number falling from 200 to 48 per minute, whilst the cardiac beats rose from 220 to 340 per minute, so that it would appear that the vagal centre was paralyzed. The pupil became widely dilated, and the heart, when death occurred, was arrested in systole. Fliess appends the results of some other experiments he made on acetyl piperidin, benzyl piperidin, and methyl piperidin; also of some experiments on coniin.—*Lancet*, July 28, 1883.

—

Iodoform.

Dr. HOFMAKL, at the conclusion of a paper on the surgical uses of iodoform, draws the following conclusions:—

1. Iodoform is an excellent disinfectant, and, as a rule, is a painless application to wounds.

2. On account of its slight solubility, it is of little value in complicated wounds of cavities.

3. It does not prevent the occasional outbreak of erysipelas.

4. It is not a specific against scrofulous or tuberculous processes, and develops its healing properties most notably in ulcerous processes.

5. By keeping wounds fresh and clean, it furthers granulation, though it has but little influence on the final cicatrization of the wound.

6. Very thin layers of powdered iodoform do not hinder union by first intention.

7. In pharyngeal and laryngeal diphtheria of children, iodoform does not give much better results than other antiseptics.

8. In wounds and ulcers of the mouth, rectum, and vagina, as well as in open, easily accessible wounds in the cavities of bones, iodoform, in the form of a 30 to 50 per cent. iodoform gauze, is an excellent antiseptic dressing.

9. Parenchymatous injections of iodoform generally cause a great deal of pain, and it cannot be said that they give very excellent results in fungous diseases of joints and glandular swellings.

10. Iodoform ointments and plasters are often of good service in parenchymatous goitres and chronic swellings of glands, joints, and tendons.

11. Iodoform in large quantities is undoubtedly dangerous, and is more productive of good results, and less hurtful in small doses.

12. Childhood is not a contraindication for the use of iodoform.

13. The preliminary cleansing of fresh wounds with weak carbolized water before using the iodoform dressing is of no advantage so far as Hofmakl's experience goes.

14. The healing of scrofulous and tuberculous sores by iodoform does not prevent their return.

15. Iodoform is an excellent means for the thorough removal of disagreeable odours of neoplasm which do not admit of operation.

16. The occasional syringing of suppurating cavities with small quantities of iodoform emulsion will often have a favourable action on the quality and quantity of the pus.

17. The introduction of iodoform bougies into the urethra and bladder will often alleviate pain, as also in vesical tenesmus and suppurative conditions of the bladder, and will exert a favourable influence on those conditions of the urine in which rapid decomposition takes place.

18. The application of iodoform bougies to long fistulæ of the soft parts is more hurtful than useful, as the fistulæ are only stopped up, and the products of decomposition are not discharged. Equally unwise is the filling up of the mouth of a fistula with dry powdered iodoform.—*Medizin. Jahrbücher*, 1883, Hft. ii.

—

Anæsthetic Action of a Mixture of Air and Chloroform.

M. Paul Bert has recently communicated the results of further experiments on this subject to the *Académie des Sciences*. His experiments were made with an apparatus composed of two gasometers, acting alternately. A dog was made to respire a mixture of the proportion of ʒj of chloroform, vapourized in 30 gallons of air. The animal remained sensible during the whole time, which was prolonged in one case for 9½ hours. The rectal temperature fell to 98° Fahr. With a mixture of ʒjss of chloroform, vapourized in 30 gallons of air, death took place after about seven hours' inhalation, with a temperature of 87.8° Fahr. Sensibility persisted during the whole time, but was much feebler when the animal became cold. With ʒij in 30 gallons of air, insensibility of the skin and cornea was obtained, but it came on slowly after some agitation. Death took place in about 6 hours, the temperature having fallen to 86° Fahr. With ʒijss to 30, insensibility appeared in a few minutes. The sleep was absolutely calm, and death took place in about 2 or 2½ hours, without convulsions. The temperature was 91.4° Fahr. With a mixture of ʒiij—30, insensibility was more rapid with no reaction; death in 1½ hour, temperature 95°. With a mixture of ʒiijss and ʒiv to 30, death occurred in forty-five minutes, temperature 100.4°. With ʒivss and ʒv to 30, death occurred in 30 minutes; and in a few minutes when a mixture of ʒvijss to 30 was used. Tracheotomy was performed in every case before the experiment. The chloroform was pure. M. Bert calls attention to the following facts: 1. Whether death comes on slowly or quickly, the heart always continued to beat after respiration had ceased; there was never any cardiac dyspnœa. 2. There was no chloroform in the urine except after anæsthesia of several hours. 3. With very small doses, one may cause an enormous quantity of chloroform to circulate in the lungs, with no other objective phenomenon than a fall of temperature. 4. With slightly increased doses one may cause slow death with great lowering of temperature; but sensibility persists. In these doses chloroform acts only on the nutritive functions, probably by benumbing the anatomical elements, just as beer acts according to the experiments of Claude Bernard. 5. In larger doses, when insensibility is clearly established, death is always the consequence of continued respiration of the chloroform mixture. The larger the proportion of chloroform, the more rapid is death, and the less the fall of temperature. The experiments of M. Bert show that the method of administering chloroform is best and least dangerous by which the patient is quickly anæsthetized by a large quantity, and then kept under the anæsthetic by a much smaller amount.—*L'Union Méd.*, July 7, 1883.

Value of Hyoscyamine in Psychiatric Practice.

M. GNAUK has recently contributed a paper on this subject in which he speaks in high terms of hyoscyamine as an efficient remedy in psychiatric practice. Amorphous hyoscyamine contains a large amount of hyoscine. Hyoscine is hypnotic in doses of gr. $\frac{1}{150}$ to $\frac{1}{80}$, or $\frac{1}{52}$, subcutaneously, is hypnotic, but very toxic even in these small doses. Purified, colourless hyoscyamine is not constant in its effects, is uncertain, and sometimes toxic in doses of gr. $1\frac{1}{2}$. Crystallized, pure white hyoscyamine, in doses of gr. $\frac{1}{150}$ to $\frac{1}{32}$, subcutaneously, is more satisfactory, because, when completely pure, it can be given in quantities of known strength as a safe and efficient hypnotic, producing but little toxic effect, and, on account of its solubility, answers admirably for hypodermic use. Its most important action lies in the fact that it is hypnotic without being markedly toxic. It acts very rapidly and efficiently on insane patients as well as on others. Ten minutes after its administration, the pulse rises from 76 to 120 or 130, and then beats regularly. The narcotism may be complete, or simply manifested by lassitude, and the patient is calm though not analgesic. The sleep produced is long, lasting during the whole night. The best form for hypodermic administration is distilled water f℥vss, cherry laurel water f℥ijss, hyoscyamine grs. ivss; gr. $\frac{1}{8}$ of hyoscyamine equals grs. xxx of chloral, gr. $\frac{6}{15}$ of morphine, and grs. xlv of bromide of potassium. Gnauk has seen gr. $\frac{6}{15}$ of hyoscyamine act as efficiently in rebellious cases as gr. $1\frac{2}{3}$ of morphine. In agitated cases gr. $\frac{1}{8}$ should be used at once; with more tranquil cases one may commence with gr. $\frac{1}{12}$, increasing, if necessary, to gr. $\frac{1}{4}$ or ss. The prodromata of intoxication are increase of delirium, special hallucinations (such as seeing large animals), and great dilatation of the pupil. When the pupil is not affected the drug has not had the proper effect. A gradual effect may be attained by repeated small doses; but when the calming effect is desired a large dose should be given at once; and when repeated small doses have not the desired effect, a larger dose should be given at one time. This procedure is perfectly compatible with a continued treatment of three or four weeks. This prolonged administration is necessary in chronic cases with accesses of violent agitation. In some cases collapse may occur, but is not dangerous to life, and is easily avoided by regarding the thirst, buccal dryness, heaviness of the head, faintness, diplopia, and, in some cases, increased agitation, showing individual idiosyncrasy. Morphia is an excellent antidote. The best preparations of it are Merck's alkaloids.—*Archives de Neurologie*, July, 1883.

—

Acetal and Paraldehyde; their Hypnotic and Analgesic Properties.

Diethylacetal, belonging to the acetal family, and commonly called by that name, has been recently recommended by VON MERING as an excellent substitute for chloral. It has a bitter taste, slightly burning, soluble in eighteen times its volume of water, and soluble in alcohol in all proportions. The experiments of von Mering made on frogs and mammifers have led him to conclude that acetal and diethylacetal particularly act on the nerve centres by suspending their functions, commencing in the cerebrum and extending to the cerebellum and cord; in toxic doses they arrest respiration, and later the heart. Von Mering has used acetal on eight patients. Six slept during the whole day after taking ℥ijss –℥iij; the other two, one of whom had a fracture of both calcanei, the other subject to ataxic fulgurant pains, after taking acetal felt drowsy, and noticed a marked diminution of pain. None of the eight patients complained of any disagreeable sensations after the hypnotic effect had passed off. As acetal is less

caustic than chloral, Von Mering recommends that it be substituted for that drug in ulcerative affections of the digestive canal. It may be given in the following mixture: diethylacetal, ʒiij, suspended in fʒss of gum acacia, and fʒvj of orange flower water.

The observations published by STOLTENHOFF agree with the conclusions drawn by von Mering. Stoltenhoff reports the case of an old woman, demented for five months, very much agitated and suffering with persistent insomnia; opium had given no relief. He gave grs. xlv of acetal and she slept a large part of the night. On the next day ʒj was given; she slept through the whole night and was calm during the next day. This good effect was maintained up to the time at which the case was reported, the woman having taken over ʒx of acetal. In two other patients of this class, one affected with general paralysis, a daily dose of ʒj½ produced a calm condition and sleep. In a case of acute mania, a robust man, who was incessantly excited, a dose of ʒj gave a quiet night. The sedative and hypnotic effects were apparent in 5–30 minutes after the drug was administered, and lasted from 4–10 hours.

The observations of BERGER, of Breslau, on three insane persons were not so favourable: ʒijss of acetal gave one and a half hour's sleep to one patient; in four other cases the effect lasted 20 or 30 minutes, and in eight others there was no effect at all. Berger has seen it cause vomiting in one case, redness of the face in two others; two complained of a heavy feeling in the head and a kind of inebriety which lasted for several hours. To one patient he gave ʒjvss of acetal, and he slept an hour and a half. Leyden, of Berlin, had still less satisfactory results with acetal.

Paraldehyde seems to be a much more satisfactory drug. It is isomeric with aldehyde, and though its hypnotic properties are less energetic than those of chloral, it may be given in larger doses and with no influence on the heart or intravascular pressure. Of this fact Cervello has been convinced by his experiments on dogs and rabbits. A man suffering with sciatica took, in three doses, ʒij of paraldehyde, in aqueous solution, in one hour and a half. Two hours after the last dose, the patient was sleeping calmly, and continued to sleep for more than ten hours. Cervello thinks that paraldehyde acts much more promptly on females, and that, generally speaking, the dose must be three times as great as that of chloral.

Berger has made eighty clinical experiments with paraldehyde in his hospital service, and twenty others among his *clientèle*. In twenty cases the drug was given in the evening, and during the day in sixty cases. The doses varied from grs. xv to ʒijss. It was given suspended in sweetened mucilage of acacia with syrup of bitter orange-peel. Among the eighty experiments made in the hospital, sound sleep, of several hours' duration, was produced in nineteen cases: in forty-two, the sleep was not so long (one hour, one and a half hour, and three hours); in nineteen cases there was no soporific effect. The dose, in the favourable cases, varied from grs. xxx–ʒj; sleep came on in ten to twenty minutes after the medicine was taken. When the desired effect was not produced by ʒj, an increase to ʒiss, or even ʒijss, rarely gave a better result; on the contrary, nausea and vomiting would come on, with cephalalgia. There were never any excitant phenomena. In his private practice doses of grs. xxx–ʒj gave the desired results in twelve out of twenty cases. Berger concludes that this drug will be of service when chloral is insufficient or when there is a cardiac complication.—*Gaz. Méd. de Paris*, No. 28, 1883.

Resorcin in Hyperpyrexia, Intermittent Fever, Anthrax, and Erysipelas.

Resorcin, which has been called "poor man's quinine," is attaining a useful position in therapeutics. In Dr. Braun's clinic (*Wien. med. Presse.* i. 1883) it has been used in over 300 cases of child-bed fever, in all cases where the pyrexia attained a certain grade, and almost invariably it produced a marked reduction of temperature, generally to the normal, rarely below, which usually was accompanied by more or less sweating. In some cases this was profuse. The temperature after its reduction seldom remained low longer than a few hours, so that the dose had to be repeated in the evening when a high morning temperature had required its use earlier. The usual dose was grs. xlv., which sometimes had to be repeated. In cases where such large doses cause nervous symptoms, smaller ones are advised to be given and frequently repeated.

In intermittent fever resorcin has a position not far below quinine, although the dose is larger. Ugo Bassi (*Gaz. Med. Ital. Prov. Venet.* 1883) reports its use in twenty cases, which were all cured except three. In one case the attacks were relieved by the remedy, but it did not prevent recurrences; this happens also with quinine. In all the remaining cases the cure was permanent, the patients being instructed to avoid fresh malarial poisoning. It required only two or three doses (grs. xxx–xlv.) simply dissolved in water to effect the cure. Larger doses are not necessary. The great advantage of resorcin over quinine is its cheapness.

Dr. Skibnevsky (*Medizinskoje Obosrenije*, December, 1882) reports two cases of erysipelas in which subcutaneous injections of a five-per-cent. solution caused a rapid disappearance of the symptoms. From ten to twenty injections were made at one time into the affected area, and in each case they had to be repeated only once. It is worthy of notice that, in both cases, within about two hours after the injection not only did the fever disappear, but the temperature fell even below the normal.

Although resorcin in any form is not absorbed by the healthy unbroken skin, the contrary is the case when there is any morbid action on the skin, as in lepra, rupia, variola, scarlatina, or erysipelas, in which it both stains the skin and discolours the urine. In cases of parasitic disease of the skin its use has been attended by remarkable success. Dr. Justus Andeer has reported a case (*Aerztlich. med. Blatt*, 1883) of carbuncle in which bacilli were detected, and a guinea-pig being inoculated with the pus died of septicæmia. Other remedies had been used locally without much result, when a fifty-per-cent. resorcin-vaseline salve was applied rather freely upon the pustular erysipelatous surface of the forearm, covered by a gauze bandage. A good diet was given. After this the pain and tension diminished, the surface rapidly assumed a more healthy appearance, and the eruption soon healed. The reporter declares that resorcin, whether in strong or weak solution, is entirely free from irritation, and never produces any eruption, and is, therefore, to be preferred to all aromatic disinfectants. It is best used in the form of salve. It is completely innocuous to the skin, and causes neither hæmoglobinuria like naphthol, nor toxic symptoms similar to those caused by carbolic acid, pyrogallic acid, etc. He does not approve of subcutaneous injections of the remedy.—*Practitioner*, July, 1883.

MEDICINE.

Hæmoglobinæmia.

Prof. PONFICK has recently published an article in the *Berliner Klinische Wochenschrift*, No. 26, on hæmoglobinæmia and its consequences. It is known that many agencies have the property of displacing the hæmoglobin from the red blood-disks, so that the colouring matter is discharged into the blood-plasma. The transfusion of foreign blood, *i. e.*, blood from a donor of different species to the receiver, burns of the surface of the body, and many chemical substances (pyrogallic acid, arseniuretted hydrogen, potassic chloride, etc.), possess this property. Peculiar as is the bond of connection between the stroma of the red blood-disk and its hæmoglobin, yet the union is very easily dissolved. In fact, to prepare hæmoglobin from the dog's blood, it is sufficient to add ether, and keep in a cool place, then filter the red mass of crystals thus formed, redissolve in water, and recrystallize. From what has been said, there will be no difficulty in comprehending the full meaning of the term hæmoglobinæmia. The notions which Ponfick has on the subject may be enumerated in the following fashion. There are different degrees of hæmoglobinæmia. When this state exists the altered products (of the blood) are disposed of in three directions. The spleen is enlarged with the fragments resulting from the destruction of the blood—that is one direction. The liver secretes an excessive quantity of bile (hypercholia); and lastly, the *débris* of the decomposition of the blood (implied in the setting free into the blood-plasma of the hæmoglobin) is excreted by the kidneys. With limited hæmoglobinæmia there is neither hæmoglobinuria nor icterus. When the hæmoglobinæmia is greater in degree, some of the colouring matter of the blood appears in the urine, and there are signs of slight and transient jaundice. Profound destruction of the red blood-elements is followed almost instantaneously by intense and prolonged hæmoglobinuria (associated with exudative nephritis) as well as marked and severe icterus.

Much food for reflection is offered in these scientific speculations by Ponfick. The views promulgated may help to throw light on many morbid phenomena. Good grounds certainly exist for the opinion that the spleen and possibly other organs are concerned in the destruction of the red blood-disk. A further consideration is the fact that the blood is constantly being destroyed and renewed. Now, if there be constantly going on a dissolution of the red blood-elements, it follows that at least a local hæmoglobinæmia always exists; unless, indeed, we regard the dissolution as always occurring in the solid elements of the tissues concerned. Some physiologists teach that the hæmoglobin thus set free is converted, probably by the hepatic tissue, into bilirubin, the principal colour-constituent of the bile. There is much plausibility in such a view. Indeed, it is very probable that hæmoglobin is the source of all the pigments of the body. Granting these considerations, we may conceive how, step by step, an increase in the degree of hæmoglobinæmia may entail all the consequences which Ponfick has claimed for this excessive destruction of the red blood-disks in the blood circulation. The importance of these plausible conjectures in connection with the explanation of the occurrence of hæmatinuria and jaundice, which have been so often observed in malignant and septic fevers, is obvious. Again, hæmatinuria has been met with in purpura and scurvy, also after poisoning by arseniuretted hydrogen or carbonic anhydride, and as a distinct affection, named paroxysmal or intermittent hæmatinuria. The relations which have been observed to subsist between ague, oxaluria, rheumatism, and this intermittent hæmatinuria are well worth remembering at this time. If the enlargement of the spleen in ague coincide with the

excessive production of hæmoglobinæmia we might expect some corresponding evidence of the excessive production of blood-pigment. It would perhaps require no great ingenuity of argument to harmonize these considerations with the facts observed in acute and chronic malarial poisoning. Hæmoglobinæmia may be looked upon also as the precursor of icterus in the form which has been known as "hæmatogenous" jaundice. The actual coexistence of hæmoglobinuria and icterus is spoken of by Ponfick, and he believes that the hæmoglobin passes over unchanged in the urine when the liver is incapable of converting it into bilirubin, the power which the liver has in this direction being limited.—*Med. Times and Gazette*, August 18, 1883.

—

Renal Form of Typhoid Fever.

Dr. DIDION, who chose this subject for an inaugural dissertation, comes to the following conclusions. Typhoid fever produces a renal congestion, which plays an important part in the course of the disease. Albuminuria is almost constant, but generally slight and temporary; when abundant, it is a sign of true nephritis. The renal inflammation is both parenchymatous and interstitial, and produces certain characteristic symptoms, such as asthenia, stupor, dryness of tongue, œdema of the face and legs, lumbar pains, cutaneous eruptions (pemphigus, ecthyma, boils), and an alteration in the urine, which has a reddish colour and the odour of boiled bread; in the deposit, red and white blood-corpuscles are found, as well as casts; the urine contains a large quantity of albumen. The diagnosis can easily be arrived at by the above-mentioned symptoms. The termination is often fatal, either from asthenia or uræmia.

As to the treatment, Bouchard recommends carbolic acid and the salicylates, Polli the sulphites, Klebs the benzoate of potash. Leeches, mustard poultices, and cupping in the lumbar region, are useful; but blisters, even with the addition of camphor, must be avoided. In certain cases, the disappearance of the symptoms is accompanied by abundant diuresis, which ought, therefore, to be favoured if possible; but all diuretics are not equally good, those which possess irritating properties must be avoided. The best in these cases is milk, pure or mixed with water. Whatever may be the way in which it acts on the kidneys, it is always well borne, and its action is double; it increases the secretion of urine, and hastens the elimination of toxic principles, without producing any irritation, even in the most acutely inflamed kidney. Subcutaneous injection of pilocarpine might perhaps be useful; in one case, when the skin was dry and burning hot, Dr. Didion injected twice daily one-sixth of a grain of pilocarpine, and under its influence the skin became moist and abundant sweat was produced; the tongue also was less dry than before; the temperature fell in two days from 105.8° to 98.6° F.; but three days later the patient died, after the temperature had once again reached 104° F. New investigations are necessary before we can arrive at definite conclusions. As for the cold baths, Gubler thinks that they are contraindicated in case of nephritis, but Libermann considers their use as surely beneficial in spite of it. Several patients who had been subjected to that treatment did not complain of any inconvenience, and cold lotions rapidly applied to the trunk and limbs with a sponge seem to relieve the patient, lower the temperature, and re-establish the functions of the skin. All these advantages must be weighed against the danger of a renal congestion; but further experience alone can show which treatment is most advantageous.—*British Med. Journ.*, July 7, 1883.

Treatment of Cholera.

Dr. B. Ward Richardson concludes a series of papers on the Treatment of Cholera during the First Stage and during the Fever of Reaction, as follows:—

In cases where it is clearly shown that the symptoms have followed indulgence in any kind of food or fruit that has created stomachic or intestinal derangement, I have found it good practice always to administer a dose of castor oil, and, if necessary, to repeat the dose. After Dr. George Johnson's essay on administration of castor oil I was bolder than before as to this plan, and, I think, with favourable results. So soon as the oil has acted by the bowels—for, singularly enough, it rarely excites vomiting—I have given in every case a mixture containing creasote, opium, and camphor. The following is a good form: Pure creasote, ♏xij; compound tincture of camphor, ℥ss; pure glycerine, ℥ss; distilled water, ℥ss—to make a mixture of twelve doses, of which one fluidrachm in a wineglassful of water may be taken every hour until the vomitings and the discharges from the bowels are relieved.

Creasote in small repeated doses, in combination with opium and camphor, as formulated above, checks the choleraic discharge, relieves the spasm, and is the most demonstrably curative of any remedy I have known.

Treatment in the Stage of Reaction.—I doubt if there be any stage of cholera in which more careful treatment is demanded than the stage of reaction. One is very apt to be deceived by the transition from the cold stage of collapse to the stage of fever. At first all seems well. The cold extremities become warm; the cold breath, so characteristic of cholera that it would yield a diagnosis almost of itself to those who have seen cholera, is again natural; the cramps have ceased; the mind of the patient is easy; the anxious, shrunken expression has departed; the voice has lost its bleating sadness; everything bids fair for recovery. An hour or two passes, and all is changed; there is intense fever, dry skin, parched tongue, nausea, often deliriums and too often a second collapse, assuming what was once commonly called the typhoid type.

The reaction is as close as it can be to that which succeeds exposure to extreme cold or starvation, and the treatment required to meet it is practically the same.

When the stage of collapse has decidedly passed away, the safest practice is to prevent every artificial means of stimulation. Hot drinks, rich foods, alcoholic stimulants, over-clothing, over-heating of the air of the room, are all to be specially avoided. The patient may continue to drink cool watery fluids, he may be allowed watery fruits like melon, but he must not be rapidly fed. He may be relieved of medicine. He must be allowed to rest and sleep.

If, in spite of all precautions, the febrile state does occur, and if the pyrexia runs high, the plan is to combine the application of the cold band to the cervical region and to the head, with administration of cool drinks in abundance, and continued absolute rest.

Medicinally, ammonia, largely diluted with water and milk, is the agent most likely to retain the fluidity of the blood and prevent septic change. Or ammonia might be exhibited by inhalation in the form of ammoniated chloroform, after the manner I have recently suggested for the reduction of zymotic pyrexia.—*Med. Times and Gaz.*, Aug. 25, 1883.

—

Diabetes in Children.

Senator, in speaking of the pathological appearances of diabetes occurring in children, remarks that the opportunities for observing them are few in number not only because the disease rarely causes death, but also because the patients, on

account of the long course of the disease, seldom remain in the hospital. The most frequent changes are found in the brain; inflammatory and degenerative conditions of the fourth ventricle often occur, also tumours in that situation or in the cerebellum; these tumours are tubercular or gliosarcomata; there are also in some cases syphilitic exostoses of the skull, together with gummata of the liver. Prof. E. Hagenbach reports the following case: A girl four and a third years old, and previously healthy, began in the winter of 1879 and 1880 to be very fretful, to drink a great deal of water, and to lose her appetite; soon after she would not take anything but milk and water, and cried out for it in her sleep at night. The renal secretion was very large in amount, and there was decided emaciation. There was no history of injury; the parents were living and healthy, and there were three other healthy children. Hagenbach first saw the child December 23, 1880, after she had been in this condition for a year; she was pale and feverish, very restless and irritable. Nothing abnormal was discovered on examination of the chest. She drank a great deal of water. The specific gravity of the urine was 1004; no albumen; no sugar. December 24th she vomited. December 25th she complained of headache. December 27th there was sudden loss of consciousness, with stiffening of the limbs and a quick pulse. On the following day there was converging strabismus, twitching of the right arm and leg, and the right side of the face, and great somnolence. January 2d the pupils were dilated and not reacting, the right pupil being narrower than the left. January 6th death took place without convulsions. The patient passed immense quantities of urine, which it was impossible to measure accurately, during the latter part of her life; the specific gravity varied between 1000 and 1004, and there was no sugar found at any time, although repeated examinations were made. The post-mortem showed the principal changes to be cheesy tubercle of the infundibulum; meningeal tubercle and distension of the fourth ventricle and the lateral ventricles; tubercular peribronchitis at both apices, with a few fresh miliary tubercles of the left lung; follicular ulceration of the large intestine; interstitial hepatitis; hemorrhages in the kidney, and hemorrhagic erosions in the stomach and duodenum.—*Boston Med. and Surg. Journ.*, July 26, 1883.

—

Melituria after Scarlatina.

Dr. ZINN, of Bamberg, reports the following case: January 27th a boy, four years of age, previously strong and healthy, and of healthy parentage, was seized with scarlet fever and diphtheria. The eruption faded on the seventh day, and the diphtheria gradually subsided. On the thirteenth day an otitis externa appeared, and stormy vomiting with rapid development of œdema and ascites, the urine now for the first time showing evidence of nephritis, being lessened in quantity, and showing a large amount of albumen and numerous casts and blood corpuscles. In a few days the more dangerous symptoms passed off, the patient being treated with hot baths and injections of pilocarpine, and a diffuse diuresis having set in the œdema and ascites quickly disappeared. Although the appetite improved considerably the little patient's strength did not return, so that he remained in bed during the whole month of March. Early in April, on attempting to walk, he was found to have paralysis of the right leg, which, however, soon passed off under the administration of iron without electricity. At this time also a slight amount of albumen appeared in the urine. The next symptom which presented itself was increased action of the heart, even noticed by the child himself. On the 10th of April the urine had a specific gravity of 1030, and a considerable amount of sugar. The amount of urine passed in twenty-four hours decreased to between 750 and 1000 cubic centimetres. The appetite was good,

but not excessive; the thirst was not noticeably increased, and nothing else abnormal was discovered. The child was placed on an exclusively meat diet, with milk, eggs, and red wine, and by the end of April there was only one per cent. of sugar in the urine, and by the middle of May one-fourth per cent. From this time the child improved in strength, and was allowed to have a mixed diet, and by the middle of June the urine was free from both sugar and albumen, and the patient soon became as strong and well as ever.

This case is of unusual interest, both from the rarity of its occurrence as a sequela of scarlet fever and from its unusually favourable result. Külz, in his article on diabetes mellitus in Gerhardt's *Handbuch der Kinderkrankheiten*, states that out of 111 cases of this disease only seven recovered. The same author mentions that the cause in two cases appeared to be measles, but no case is attributed to scarlet fever. Redon, in his collection of cases of diabetes,[1] gives, among other causes, weakness from previous diseases, such as measles, scarlet fever, typhoid, etc. Yet on looking over the original articles from which he gathers his cases scarlet fever in no instance is found to be a cause. Thomas, in Ziemssen's *Handbuch der Allgemeinen Pathologie*, Band i., s. 290, speaks of the appearance of sugar in the urine with cerebral symptoms occurring during the stage of fever in scarlet fever, but not as a sequela of that disease. In view of this case of Zinn's it would be well during a convalescence from scarlet fever to examine the urine carefully for sugar as well as albumen where the patient does not gain in general strength as fast as he ought to.—*Boston Med. and Surg. Journ.*, July 26, 1883.

—

Acetonuria and Diabetic Coma.

The termination of diabetes by acetonuria or acetone intoxication, if one may judge by recent statistics, seems to be much more frequent than is generally supposed. S. Mackenzie has noted it 19 times in 37 cases of diabetes, and 26 times in 43 other cases observed in Guy's Hospital. From these facts he believes that he is justified in concluding that young diabetics frequently die in coma, the disease developing in these with a certain acuity, and the lungs being sound or invaded only by the lesions of commencing phthisis.

In a work on diabetic coma Frerichs reports no less than 25 cases coming under his own observation, of which he made detailed observations. He divided these into three groups: the first comprehending cases of diabetes with rapid death, the patients having died in a comatose state in a few hours after being seized, without prodromal symptoms, with general feebleness, failing pulse, and cold extremities. Some of the patients in this first group already had marasmus. In the second group the comatose state was preceded by prodromal symptoms, general feebleness, gastric symptoms, nausea, vomiting, and obstinate constipation, or by some local affection such as dental abscess, pharyngitis, phlegmon with tendency to gangrene, bronchitis, or broncho-pneumonia. Before falling into the somnolent and comatose state the patients have headache, agitation with delirium, great pain, sometimes true accessions of mania, and dyspnœa; at times they make deep inspirations and expirations; the pulse becomes rapid and feeble; the temperature descends below the physiological level. This state lasts from three to five days. In the third group Frerichs places the diabetic patients who, without the least dyspnœa or pain, with firm pulse and well preserved vital forces, are suddenly taken with headache, a kind of intoxication, and finally somnolence, coma, and death.

The numerous remedies which have been proposed against these accidents

[1] Virchow und Hirsch, Jahrb., 1877, Band ii.

seem to be equally inefficacious. Frerichs cites, among others, transfusion, the administration of oxygenated water, stimulants, weak solutions of phosphate and chloride of sodium, subcutaneous injections of ether, camphorated oil, antizymotics, carbolic acid, salicylic acid, etc. Of the causes of diabetic coma we are still ignorant; the alterations of the nerve centres, as offered in explanation by some, are not constant; others speak of thickening of the blood by an accumulation of sugar in it, a morphological and functional alteration of the red globules. This gratuitous hypothesis has led to dangerous therapeutic measures; others have attempted to unite diabetic coma and uræmia by ascribing the former to insufficient excretion of urine. Frerichs relates a case of uræmia in a diabetic which conclusively proves that there can be no possible assimilation between the intoxication of Bright's disease and that of diabetes which produces fatal coma. Ebstein has attributed diabetic coma to a retention of the excrementitious products of the blood, occasioned by a necrosis of the renal epithelium at the level of Henle's tubes. This lesion is too inconstant to explain the result. Frerichs has observed that in diabetics the epithelial cells of the tubules were constantly the seat of a hyaline degeneration, due to an accumulation of glycogen in the cells. The sole fact of its constancy in diabetics, who have succumbed to it matters not what complication of this degeneration, cannot be held to be the cause of the comatose condition.

Frerichs has never been able to discover traces of fat emboli in the pulmonary vessels of the glomeruli of the kidney, of the liver or brain, as has been suggested as a possible fact in the pathogenesis of diabetic coma. In fine, says Ricklin, it is commonly admitted to-day that acetone and diacetic ether, which for a long time have been considered as causes of diabetic intoxication and coma, have no part in its development; diacetic ether pre-exists neither in the urine nor in the blood, and both acetone and diacetic ether are frequently injected into the veins of animals in laboratories.

Jaksch has shown (*Zeitschr. f. Physiol. Chem.*, t. vi. 541, 1882) that acetone is a product of malassimilation which is found in the blood and urine in the normal state, and that it is increased in certain pathological sates; he says that every febrile affection, from whatsoever cause, is accompanied by acetonuria; and that the quantity of acetone eliminated by the urine, which may reach five centigrams in twenty-four hours, is in direct proportion to the intensity of the fever. Jaksch has seen cases of diabetes in which only normal quantities of acetone were eliminated by the urine; other cases present a true acetonuria, the urine turning red when heated with perchloride of iron. In still others, advanced diabetics, this reaction coincided with the presence of a considerable quantity of acetone in the urine. Of this third class many patients succumb to diabetic coma. Jaksch has twice found pronounced acetonuria in young men suffering with gastric troubles, saburral tongue, anorexia, constipation alternating with diarrhœa, cephalalgia, slight tumefaction of the spleen without fever. In these cases the urine heated with perchloride of iron gave the red color. He has also found a large quantity of acetone in the urine of persons with hydrophobia, as well as in cases of cancer of the stomach, in a case of cancer of the œsophagus, and in one of cancer of the stomach and pancreas. In another case dying in a state precisely similar to diabetic coma, the autopsy showed cancer of the pylorus, with metastatic foci in a large number of organs. (Ueber Pathol. Acetonuria, *Zeits. für Klin. Med.*, t. v. fasc. iii. p. 346.)—*Gaz. Méd. de Paris*, July 7, 1883.

Resorcin in Whooping Cough.

In an interesting article, recently published, Dr. MONCORVO, Professor of Diseases of Children in the Polyclinic of Rio de Janiero, strongly advocates the employment of resorcin in pertussis.

He considers the parasitic origin of pertussis as established, and believes that resorcin is the proper germicide. Indeed, its parasitic origin now scarcely admits of a doubt since Burger, of Bonn, published his conclusions, which were that: 1. The bacilli were only encountered in the sputum of patients affected with whooping-cough. 2. They appeared in such quantities in the sputum of these patients that their influence could not be doubted; and, 3. The intensity of the case was in direct proportion to the abundance of the leptothrix buccalis. The experiments and examinations of Dr. Moncorvo and Prof. Silva Araujo fully confirmed Burger's conclusions.

Having satisfied himself as to the origin of whooping-cough, Prof. Moncorvo concluded that the most effectual theurapeusis was a local application to the laryngeal mucous membrane, and in view of its non-irritating qualities, resorcin seemed to be peculiarly adapted in these cases. It should be used in an aqueous solution of one per cent. and applied to the epiglottis and larynx by means of a camel's-hair pencil well curved and suitable for introduction into the larynx. Contrary to what would be expected, the application is not irritating to the larynx, nor does it bring on a paroxysm of cough, except at the first one or two applications. The taste and odour, not being disagreeable, increase its value for this purpose. It is, as we know, harmless when given internally to very young children even in large doses. It is important that a pure article be used; pure resorcin is very white, and occurs in the form of crystalline needles of silvery brightness. Besides the fourteen cases reported in detail, he has successfully treated twenty other cases with it, some very obstinate and complicated by hereditary syphilis, intermittent fever, threatened hydrocephalus, etc. Of the fourteen cases of which detailed reports are given, many are interesting on account of the rapidity with which the application caused the disease to disappear; in eight cases, variously complicated by hereditary syphilis, intermittent fever, marasmus, diarrhœa, and pulmonary tuberculosis, the disease had entirely disappeared in six weeks. In fact, of these cases, only two remained uncured at the end of four weeks, some being completely cured in one and two weeks.

From these facts he feels justified in concluding:—

1. That whooping-cough, whose nature and genesis, up to a very recent period, have been variously interpreted, may now, on account of recent microscopical observations, be classed among the parasitic diseases.

2. That the disease appears to be due to the presence of micrococci, which multiply with great rapidity in the hyperglottic region of the larynx, infiltrating the epithelial cells, which cells appear to be the elective seat of their development.

3. That resorcine, applied directly to the laryngeal mucous membrane, caused, in every case in which it was employed, rapid decrease in the number of the paroxysms, marked decrease of their intensity, and recovery in a short time without the aid of other medication.—*União Medica*, March, April, and May, 1883.

—

Pathology of Bronchial Asthma.

Prof. RIEGEL, of Giessen, in approaching the consideration of the pathology of asthma, remarks that there are several distinct questions involved, which are still more or less imperfectly settled. The first of these questions manifestly is: Is there really such a function in the bronchial muscles as active contraction, sufficient to affect the calibre of the tubes and to modify the pressure of the air within the lungs? Very different have been the answers given to this question by different physiologists—for we must be careful to notice that this is but a matter of physiology, and not of clinical medicine. Prof. Riegel's results are entirely in

accordance with the accumulating evidence of the work of recent, as well as of some of the older and most distinguished, observers; namely, that irritation of the bronchial muscles does raise the pressure within the lungs, and that this irritation may be induced through the medium of the vagus. This point having been settled, the next question was whether stimulation of the vagus caused acute dilatation of the lungs, such as is seen in asthmatical seizures? And this question, also, Prof. Riegel was able to settle in the affirmative, the pulmonary area enlarging rapidly when the vagus was galvanized in the neck (in dogs), remaining large during the continuance of the stimulus, and slowly returning to its normal dimensions when the irritation was removed. Nothing could have been more easy, or, indeed, more natural, than to conclude after these two series of experiments that the pathology of bronchial asthma was practically settled; that this disorder is essentially a neurosis of the vagus, the dyspnœa due to bronchial spasm and the pulmonary dilatation being the direct results of irritation of the great nerve of respiration. Prof. Riegel was too cautious, however, to rush to this conclusion, and his next set of observations showed the wisdom of his hesitation; for they distinctly proved that whilst irritation of the vagus unquestionably produces the phenomena of asthma, *it does not do so by causing spasm of the bronchi*. No doubt, as has just been shown, spasm of the bronchi is a result of irritation of the vagus; but there is a much more important, because much greater or more extensive, cause at work than this.

The turning-point in the investigation was the discovery that irritation of the vagus causes the phenomena of asthma, not by acting peripherally—that is, through the branches to the bronchi—but by influencing the central extremity of the nerve, that is, the medulla, and so (reflexly) the muscles of respiration. When the *central* end of the divided vagus of the left side was faradized, and the other vagus cut, the same asthmatic phenomena were produced; the reflex, therefore, did not occur through the bronchial nerves, but the respiratory nerves to the diaphragm and intercostals. That this was the case was completely proved by section of the phrenics before irritation of the vagus, for the phenomena of asthma then were entirely absent. An altogether unexpected result was thus reached, namely, that asthmatical phenomena may be produced *reflexly* through the vagus, and that the principal portion of the effect is a sudden inspiratory depression of the diaphragm, followed by its continued tonic contraction. It would thus appear that the theory of asthma, which represents the disorder as essentially one of bronchial spasm, must be given up. There can be no doubt that irritation of the vagus does cause bronchial spasm and moderate dilatation of the lungs, but this effect has always been regarded as much too insignificant to account for the symptoms of the disorder as clinically observed; and now that it appears to have been satisfactorily proved that besides this peripheral effect there is a reflex effect of incomparably greater importance, there is no reason why the theory of bronchial spasm should be any longer maintained.

Two very obvious objections to the view first stated are anticipated by Prof. Riegel. Can it be possible, in the first place, that the diaphragm may remain so long in a state of contraction as to cause the protracted dyspnœa familiar in many cases of asthma? There is no evidence to the contrary; and in the course of these experiments on dogs the diaphragm was actually seen to remain in a condition of contraction for ten minutes without producing asphyxia. Besides, the same objection might apply to the muscles of the bronchi. Again, it is a clinical fact that whilst the inferior lung-border is low in an attack of asthma, it moves in respiration. Is this fact compatible with spasm of the diaphragm? As a matter of fact it is; whether the phrenic be directly or indirectly stimulated, and the diaphragm thrown into inspiratory spasm, the lung-border moves slightly in respiration.

Lastly, Prof. Riegel cautions us against coming to the hasty conclusion that we have now settled the pathology of bronchial asthma. Spasm of the diaphragm may explain some of the phenomena of the seizure, but it certainly will not explain all. For himself, he still holds that there may be vaso-motor disturbance and hyperæmia of the bronchi, along with spasm. Still, spasm there is, and the present investigation shows that it is chiefly a spasm of the diaphragm.—*Practitioner*, July, 1883.

—

Fatty Transformation of the Kidney.

Mr. Edwin Rickards, in an interesting paper in the *British Med. Journ.*, July 7, 1883, on this subject, says that in fatty transformation of the kidney, there is a replacement of renal tissue by true adipose tissue, the contour of the organ being, to a varying extent, preserved. The condition is a rare one, and the cases on record are few. It has not, as far as I am aware, been before portrayed, numerous and excellent as are the illustrations of the various morbid changes in the kidney by Bright and others.

Whatever be the source of the fat, there can be no doubt that it is not degenerated renal parenchyma, and it is equally certain that the fat does not stamp out renal tissue. It seems probable that the fat is developed to fill up space created by the breaking down and discharge of renal substance, and that the process is one of physiological compensation, an effort of nature to prevent a vacuum. The origin of the fat may be accounted for in three ways: 1, hypertrophy of the circumrenal fat, which pushes its way into the interior of the organ at its hilum; 2, hypertrophy of the fat, which normally is found in small amount in the interior of the organ between the apices of the pyramids; 3, absorption of fat by the cells forming the stroma of the organ.

Statistics go to show that fatty transformation of the kidney is frequently associated with renal calculus. Even in Dr. Whipham's case (*Pathological Society's Transactions*, vol. xix.), a calculus may have escaped from the kidney, and found its way out of the body through the wound in the thigh. It is reasonable to suppose the sequence of events in such cases to be renal calculus, suppuration, and discharge of renal parenchyma and its substitution by fat.

The condition under consideration, though a rare one, must not be left out of calculation by the nephrectomist.

Case.—Alfred Rowen, aged 24, was admitted into the Birmingham General Hospital, February 16, 1883. He was a broad-built, well-nourished man. When seen at 10 A. M., he had extreme dyspnœa, sitting with his arms leaning on the arms of the chair. The alæ nasi and muscles of extraordinary respiration were working; his face was covered with beads of perspiration, and a little dusky. He was operated on for stone twenty years ago. For many years, he had known that his kidneys were diseased, because he sometimes passed matter in the urine. Occasionally he wetted his bed. Three weeks ago, he passed blood in his water, and vomited blood; he only vomited on that one occasion; at that time, he commenced making a noise in his throat, especially when asleep at night, and so loud that it kept awake fellow-lodgers, and, in consequence, he had to sleep in a separate room. During the last fortnight, he had been off work, and a great deal in the house. He had been very drowsy, sleeping during the day in his chair for two or three hours at a time. He had frequently played cards; and, on many occasions, he had suddenly jumped up, and said: "I must leave off; I have got the cramps in my fingers and legs." The fingers and legs would be drawn during these cramps, which lasted about ten minutes at a time.

When examined in the ward, his breathing was very laboured. The dyspnœa was essentially inspiratory. The suprasternal notch, the lower intercostal spaces,

and epigastrium sank in during inspiration. Laryngeal stridor could be heard at the other end of the ward. He was unable to speak, but protruded his tongue when asked to do so. His pulse was 120; temperature 100°; respiration 40. Nothing abnormal could be heard in connection with the heart. On rapidly examining the lungs, mucous crepitant *râles* were heard over both bases behind. Examination of the fauces showed nothing. His legs and feet were not œdematous. Two ounces of urine were obtained, which was found to be alkaline, and to contain albumen and a large amount of pus. He became more comatose, the dyspnœa greater, and the breathing more stridulous. At 1 P. M., tracheotomy was performed, apparently without pain, but without manifest relief. He died at 4 P. M. on the day of admission.

Post-mortem Examination.—The body was well-nourished. The larynx was purple and œdematous. The lungs were œdematous. The heart was normal. The brain was not examined. The other viscera, except the kidneys, were free from morbid change. Both kidneys were imbedded in fat. The left kidney, which was half as large again as normally, on section was found to be transformed into true adipose tissue. Its capsule was thin. At its hilum, there was a mass of tough, dense tissue, like cicatricial tissue, which extended to the centre of the organ, and in it was impacted a triangular calculus, the size of a tamarind stone; this mass was found to be composed of the obliterated pelvis and ureter, with bloodvessels mostly collapsed, and connective tissue. The adipose tissue was divided for the most part into pyramidal masses by paths of connective tissue, which radiated from the calculus. In this connective tissue ran large bloodvessels. The corpuscles of this tissue were proliferating, and absorbing fat. In two or three spots, near the periphery of the fatty mass, there were small patches of condensed tissue, which the microscope showed to be the remnants of atrophied renal tissue. The ureter remained as an impervious cord. In the right kidney, there were areas in various stages of degeneration; the secreting tissue was reduced to about one-third its normal amount, and this was intensely inflamed. There were circumscribed masses of putty-like matter, and several thick-walled empty sacs; in one sac was a smooth, round calculus, the size of a pea. The pelvis, which was thickened and dilated, contained a calculus, weighing half an ounce.

—

Adenoma of the Kidney.

According to a recent article by Drs. A. WEICHSELBAUM and ROBERT W. GREENISH, adenoma of the kidney has hitherto received but little attention in works on pathological anatomy; but this is not due to the fact that it occurs unfrequently; on the contrary, although not a very common, it is not an uncommon affection.

Macroscopical Conditions.—As to its situation, adenoma seems to be equally often found in either kidney. It seems to occur generally in the neighbourhood of the upper or lower end, and most frequently in the cortical portion, and rarely in or near the pelvis of the kidney. Whenever it occurs in close proximity to the outer surface of the kidney the capsule is involved. As a rule, there is only one adenoma of a kidney, though two may be present, and cases have been found in which a number have occurred at the same time. It occurs in both kidneys at the same time in about 20 per cent. of all cases. The size of the growth may be as large as a walnut or hazel-nut, seldom so large as an egg, or so small as a millet-seed. Its consistence is usually the same as that of the normal kidney-substance, with the exception of those cases in which fibroid or fibrous metamorphosis has taken place, or when fatty degeneration occurs.

From an histological standpoint, adenomata of the kidney may be divided into two principal forms—the papillary, and the alveolar:—

Papillary Adenoma.—When papillary adenoma is completely developed, it is separated from its surroundings by a capsule more or less thick, and lying either in a single or several small cavities, the spaces being completely or partially separated from one another, and are filled with papillary growths. These grow out from one or more centres of the cavity wall, with a vascular network, sometimes abundant, and again deficient in round and spindle cells. When one or several growths are examined they somewhat resemble a tree. The walls of the cavity are lined with a layer of epithelium, the cells of which have various forms and sizes, though the cylindrical epithelium is the type most usually found. Not infrequently the epithelial cells have undergone a fatty degeneration, and in some cases pigment granules are also found. In every case in which the tumour has several cavities, there is found between them a fibrous web, or kidney substance. In the latter case the uriniferous tubules are easily seen variously compressed, or distended with colloid matter, whilst Malpighian capsules have undergone fibrous degeneration, or are transformed into colloid cysts. When more recent stages of papillary adenoma are observed, however, it is seen that it is not limited by the surrounding kidney substance. It is made up of numerous cavities containing gland lobules which increase from the periphery toward the centre; the cells bearing a striking resemblance to the epithelium of the collecting tubes of the cortex. The lobules lie so close together that there is scarcely room between them for a fine connective tissue stroma, though in some places there is quite a wide separation.

Alveolar Adenoma.—This is shown, as its name indicates, by an exquisite alveolar structure. The alveoli are of various sizes and shapes, the smallest being less than the cross-section of a convoluted tubule. They are round, oval, cylindrical or irregular in shape, and contain epithelial-like cells, or there may be a central fissure or a complete lumen. The cells have a peculiar character, being generally large, polyhedral or prismatic, or wedge-shaped, still free from retrograde metamorphosis, and lie in a homogeneous or granular protoplasm. Between the alveoli is a very spare connective tissue stroma, which is structureless, or contains spindle-shaped cells, and in which the bloodvessels ramify. When the alveolar adenoma attains a certain size, like the papillary adenoma, it becomes invested by a capsule. Whilst both the papillary and alveolar adenomata have clearly defined forms and are easily recognized apart, during their genesis they so closely resemble each other that they can scarcely be distinguished.

Few tumours are so certain to undergo a retrograde metamorphosis as adenomata of the kidney, the metamorphoses taking place in the following order as to frequency: 1, fatty; 2, fibroid; 3, fibrous; 4, cavernous and pigment metamorphosis; 5, cystic degeneration; and 6, colloid degeneration with the formation of concretions in the stroma.

Differential Diagnosis—The diagnosis between adenoma and carcinoma is most important. Alveolar adenoma may easily be confounded with carcinoma, as not only the alveolar structure, but the cells resemble those of a carcinomatous tumour, the adenoma cells being scarcely less polymorphous than cancer cells. But after an adenomatous tumour has attained a certain size it possesses a capsule, in which respect it differs from carcinoma. A careful microscopic examination, however, will decide the diagnosis.

From fibro-sarcoma of the kidney adenoma is diagnosed by the fact that fibro-sarcoma occurs in old age, and only in the medullary substance of the kidney, and by the well-known microscopic appearances of sarcoma. Adenoma is easily diagnosticated from hæmatangioma cavernosa, and from cystic disease of the kidney by the macroscopic and microscopic appearances.—*Medizin. Jahrbücher*, 1883, Hft. ii.

The Nature of the Albuminuria of Bright's Disease.

SEMMOLA, of the University of Naples, has recently communicated the results of his last researches on this subject to the Academy of Medicine, of Paris. It is now quite well established that the term "Bright's disease" is defective, and should only be cousidered as a general term under which different lesions of the kidney may be grouped, differing in seat and in the nature of their processes. Formerly the different lesions observed in the kidney were considered as the successive phases of the same disease; at present no one retains this idea. The name "Bright's disease" should be reserved for permanent, chronic albuminuria, for diffuse parenchymatous nephritis. What first produces the passage of albumen into the urine? Gubler, Jaccoud, and Semmola hold that the origin of the disease is in an altered state of the blood. Under some special influence the albumen of the blood is altered or increased, and then becomes capable of passing through the glomeruli. Others, as Dujardin-Beaumetz, hold at the same time to an alteration of the blood and some lesion of the kidney as the cause.

In his latest researches Semmola has endeavoured to show that the passage of albumen through the kidney presupposes no real lesion, but that this is a result; that the albumen of the various albuminuriæ cannot be distinguished chemically, whilst a high degree of diffusibility of albumen always denotes true Bright symptoms; that the bile of Bright subjects contains albumen; that the saliva and perspiration also contain it; and that the primary cause of the affection should be sought for in some alteration of the nutritive functions of the skin. He thinks that experimental facts fully justify this theory.

The experimenter has endeavoured to reproduce as nearly as possible the processes involved in Bright's disease. With this view he has suddenly introduced a large quantity of albumen into the blood, and has cautiously injected white of egg, in small quantities at first, into the subcutaneous tissue of dogs, which were kept under its influence for more than twenty days. He has kept dogs under its influence for thirty days, making daily injections of fʒijss to more than fʒij of white of egg. After four or five days the kidneys become congested, and if the quantity injected be large renal hemorrhage occurs. After seven or eight days leucocytes appear, and fatty degeneration of the epithelium sets in; and after fifteen days the kidney commences to get fatty. If the experiment is kept up, toward the twenty-fourth day the lesions of the kidney are almost identical with those of interstitial nephritis. The introduction of albumen into the blood causes an albuminuric dyscrasia, as shown by the fact that the quantity of albumen eliminated is greater than that injected. The bile becomes charged with albumen, and Semmola thinks that he is authorized in stating that he has realized artificially the natural morbid process. But the facts here show that the albuminuria is the primary, and the renal lesion the secondary lesion.

As to the primary cause of albuminuria, Semmola is convinced that it must be sought in some alteration of the nutritive functions of the skin.

In making the experiments he used different albuminous substances, as serum of blood, yolk of egg, and milk. With these the effects were different from those caused by white of egg injections. With blood serum the renal process was less rapid, and no functional alteration was caused by injections of yolk of egg and milk.—*Revue Méd. Franç. et Étrang.*, June 9, 1883.

Semmola has been convinced for three years, after a long experience, of the many imperfections in the chemical reactions for differentiating the different kinds of albumen. He has, therefore, turned his attention to the degrees of diffusibility of the albuminoids of the blood in the different albuminuriæ, and he is convinced that the great secret to be studied lies in the different gradations

of the albuminoids by reason of their diffusibility, or, in other words, their aptitude for performing their functions in the nutritive processes; and has arrived at the following conclusions:—

1. The albuminoids of the blood of Bright subjects are much more diffusible than the albuminoids of the blood in other kinds of albuminuria (mechanical albuminuria).

2. In Bright subjects of the first stage, and therefore curable, if the blood serum is examined before and after recovery, it is seen that the diffusibility of the blood albuminoids augments, diminishes or ceases in perfect relation with the quantity of albumen eliminated by the urine. Hence it is evident that the degree of diffusibility of the blood albuminoids constitutes the true point of departure of the albuminuria of Bright's disease.

3. This physico-molecular constitution of the blood albuminoids which characterizes their non-assimilability, and which consequently causes their forced elimination, is caused by a defect, greater or less, of the cutaneous functions. In support of this view Semmola brings forward a number of laboratory experiments and clinical observations which clearly prove the relation existing between the activity of the cutaneous functions and the alteration of the diffusibility of the blood albuminoids, or their degree of assimilability. He examines, by comparison, the degree of diffusibility of the blood albuminoids before and after varnishing the skin over a more or less extended portion, so that the animal may live a sufficient time. He has found that, all things being equal, the blood serum of these animals presents at least one-third of the principal albuminoid principles which become diffused if the varnishing occupies so much as one-half of the cutaneous surface. In these cases albuminuria is also seen, and the bile of these animals contains albumen in the proportion of three to five in one thousand.

As to the clinical observations, he has collected a series of cases of chronic eczema and psoriasis which alternated in their appearance on the skin with albuminuria, and which were finally cured by a long hydrosudopathic treatment. He relates one case of cutaneous seborrhœa in which the skin perfectly reproduced the experiment of the varnished dog. Water did not moisten it, and the patient was always cold; for a long time he felt the least breath of air, and became profoundly cachectic. He had albuminuria, and it was only after a long course of hydrosudopathy that he was completely cured; the albuminuria never reappeared.

Semmola thinks, therefore, that it is incontestable that the first stage of Bright's disease is constituted by a profound modification of the albuminoids of the blood which succeeds in proportion to the progressive enfeeblement of the respiratory functions of the skin, under the influence of cold and moisture, which are, in his opinion, the fundamental causes of true Bright's disease. This action of damp cold is very slow, and Bright subjects are already victims of the disease before they are aware of it. At this period there already exist the three characteristic symptoms of the disease in their order of sequence: 1. Increasing diffusibility of the principal blood albuminoids, and, consequently, increasing diminution of their assimilability. This chemical state he calls *etheralbuminuria*. 2. Diminution of the quantity of urea on the one hand, and, on the other, forced elimination of the albuminoids, by all the emunctories whose office is organic depuration, primarily the kidneys.

From these facts he was led to analyze the bile of Bright patients after death, and he found that the distinguishing feature of Bright albuminuria as compared with other albuminuriæ is, that on analyzing the bile *post-mortem*, albumen is found in the bile in the first case and not in the second. The sweat and saliva, artificially produced, present the same differences as regards the presence of

albumen. The final conclusion which he draws is of great interest because it is grouped with the differences already noted in the different albuminuriæ. In the albuminuria of Bright's disease there is a loss of albumen which the organism produces through its different emunctories in order to rid itself of the albuminoids which have already become non-assimilable; and in the other varieties of albuminuria (mechanical, nephritic, etc.) elimination of the albumen is due to a purely local cause which depends either on the degree of pressure of the renal circulation or upon epithelial alterations.

To demonstrate this theory, built upon laboratory experiments and clinical observation, one step remained—the experimental demonstration that the non-assimilable albuminoids (and therefore foreign to the organism) are capable of producing a renal process analogous to that of Bright nephritis by the fact that they can pass through the renal filter; this Semmola has demonstrated by a long series of delicate and conclusive experiments. He injected albumen into the areolar tissue, and rejected the common experiment of injecting white of egg directly into the blood, being convinced that albumen injections into the blood cause troubles too profound to obtain a complete resemblance to *etheralbuminuria* or to *etheralbuminosis* caused naturally. He injected variable quantities of white of egg—from fℨv to fℨijss daily—always keeping an accurate record of the weight of the animal in order to establish a constant relation between it and the amount of albumen injected. After the second day there gradually came on hyperæmia, sometimes simple, then accompanied by globular extravasation into the capsule, and even into the interior of the uriniferous tubules. The capsule was distended by an amorphous or granular material having the characteristics of albumen. Later, tumefaction appeared, migration of lymphoid cells, advanced fatty degeneration, epithelial necrosis, and even proliferation commencing in the areolar tissue in the animals which had for a long time resisted albuminous injections. In order to confirm these experiments they were repeated with other and less heterogeneous substances than white of egg—such as the yolk of egg, blood-serum, albumino-peptones, and milk.

Prof. Semmola does not think it necessary to give in detail the particulars of these comparative experiments; at present it suffices to say that the more the chemico-molecular constitution of the albumen approaches that of normal blood albumen, the less injurious will be its passage through the kidneys. Thus, injection of blood-serum into the subcutaneous areolar tissue is followed by albuminuria, but, other things being equal, it produces less slowly renal irritation, which is more feeble and transitory. He has observed, lastly, in dogs an albuminuria more or less developed in relation to the quantity of albuminoids injected, and more or less pronounced according to the degree of diffusibility of the albuminoids of the blood-serum. Anasarca never appears when small quantities are injected, although a minute quantity of albumen is eliminated by the kidneys. These facts also confirm, what Semmola has clearly shown, that the chemico-molecular constitution of the albuminoids of the living organism is of the greatest variability, and that a mere trifle, the simple passage through a living membrane, is capable of modifying them, and even rendering them non-assimilable, diffusible, in other words, and incapable of performing their functions in the work of nutrition. —*Progrès Méd.*, June 16, 1883.

Relation between Serum-Albumen and Globulin in Albuminuria.

This subject has been recently thoroughly investigated by Prof. F. A. HOFFMAN. He finds that ascitic fluid contains less albumen than the serum of blood. This is not extraordinary; albumen diffuses slowly through animal membranes,

and when we make experiments on dialysis of albuminous fluids the dialysate always contains less albumen than the original fluid. But curiously enough the proportion of globulin and of serum-albumen in the ascitic fluid is tolerably near that of the blood, whereas in ordinary dialysis globulin passes through more slowly and in less quantity than albumen. This shows that transudation in living tissues goes on in a different way from dialysis outside the body. In albuminuria the relation of globulin to albumen varies much, and varies greatly in the same individual at different times of the day. Improvement in the condition of the patient is always marked by a diminution in the proportion of globulin. This is generally associated, but not always, with a diminution in the total amount of albumen. The relative proportions of albumen and globulin do not depend upon histological changes in the kidney. All kinds of proportion may occur in each form of kidney disease, but the proportion is of great practical value, inasmuch as it depends upon the intensity of the morbid processes going on in the kidney. In two persons suffering from the same form of kidney disease, the condition of the one with the smaller proportion of globulin is better. The proportion of globulin to albumen in albuminuria is often many times less than in serum. This condition differs greatly from what occurs in ascitic fluid, and agrees with what occurs in artificial dialysis. We should expect that this condition would be best observed in cases of slight lesion of the glomeruli, but on the contrary it is found that in cases of congestion, where we might be apt to assume that the albumen transudes through the glomeruli, the relation of albumen to globulin is the same as in ascitic fluid. In acute and chronic nephritis the rule may be laid down that when the lesions are slight the relation of globulin to albumen agrees with that of ordinary diffusion through parchment paper, viz., that the albumen much exceeds the globulin. The greater the lesion, the more does the proportion resemble that in ascitic fluid, viz., the more nearly do the quantities of albumen and globulin become equal.—*Practitioner*, July, 1883.

—

Hæmato-Chyluria and Chyluria.

Though the hæmato-chyluria of tropical climates has long been known, it is only within the past fifteen years that its parasitic origin has been demonstrated. Wucherer first described the parasite causing hæmato-chyluria from cases observed in Brazil in 1859. He found, in the urine of a woman, a microscopic worm with a very fine, tail-like appendage, a blunt head with a central point, and a transparent, granular-like body; its diameter was equal to that of a leucocyte, its length being sixty or seventy times as great. In 1870, Crevaux observed, at Guadaloupe, a nematode worm 265 mm. long, and .01 mm. wide, having all the characteristics of Wucherer's parasite. It was very active, its progress was rapid, and its contorsions energetic.

Lewis found the embryos of this parasite in the urine of a score of chylurics in India, and in the blood a filaria to which he gave the name *filaria sanguinis hominis*. It was, then, established that hæmato-chyluria of tropical countries coincided with the presence of a particular nematode in the blood. Recent researches have confirmed this view. Mr. Spencer Cobbold has also found a parasite in a specimen of blood sent to him from Australia, and proposed to call it the *filaria Bancrofti*. It is certain, however, that Bancroft's description is that of a worm as thick as a hair, and three or four inches long; being altogether different from the parasite described by Wucherer and Crevaux. The *distoma hæmatobium* of Bilharz and Harley differs also from the filaria which Damaschins found in a Zanzibar negro. This man had intermittent attacks of milky urine containing fat in emulsion, fibrine, red and white blood globules. He was

an hæmato-chyluric. In his urine were found embryos analogous to those contained in the stomach of mosquitoes which had bitten hæmato-chyluric patients. He also discovered in his blood, but only at night, the true filaria of Wucherer and Crevaux. When the urine ceased to be chylous, the filariæ were not found in the blood.

Dr. Stephen Mackenzie has observed a remarkable case of which he subsequently made a post-mortem examination. A soldier, born at Madras, of European parentage, found, after arriving in England, that his urine was more abundant, turbid, slimy, and by degrees quite milky. Later he was seized with violent pain extending from the left loin to the testicle. The urine averaged 120 ounces per diem, sp. gr. about 1010, reaction neutral or faintly alkaline, no sugar, a little albumen. Urea 6 per cent. Ether readily removed the milky colour. The blood at night contained numerous filariæ, the maximum being reached at midnight. None were found during the day. By inverting the order of his life, sleeping during the day, and being awake at night, the filariæ attained their maximum at noon. Symptoms of pneumonia developed at the left apex, followed by abscesses at the root of the neck and left shoulder joint. These were opened; from this time the urine ceased to be milky, and the filariæ disappeared. The patient finally died of right empyema. The kidneys were slightly enlarged, and in the early stage of suppurative nephritis. The mucous membrane of the bladder was thickened, covered with mucus, and contained extravasations. The abdominal lymphatics were greatly dilated. The thoracic duct was dilated below and obliterated above. The lymphatics of the left kidney were dilated and contained calculi. No trace of the parent worm was found; nor any communication between the dilated lymphatics and the urinary passages. Hæmato-chyluria of tropical climates is endemic in Brazil, the Bourbon Islands, the Island of Mauritius, in India, Australia, and other places. Its course is more or less irregular, during which the urine is sometimes sanguinolent, sometimes milky.

Chyluria may last for several years without gravely compromising the health. Crevaux cured a case by administering copaiba, and Wortabet has cured the hæmaturia, as seen in Egypt, by spirits of turpentine. The balsams seem to be indicated. Sometimes the disease is cured spontaneously, or under the influence of an acute intercurrent disease. No reason can be assigned for the fact that the filariæ only appear in the blood during the night.

All cases of chyluria are not parasitic. Gubler has described cases of oily urine, and Robin thinks that the chyluria of our climate is only an exaggeration of what Gubler describes. It differs from hæmato-chyluria by the absence of filariæ and hæmaturia.—*Progrès Méd.*, July 14, 1883.

—

Treatment of Leprosy.

The treatment which SURGEON-MAJOR PETERS has adopted at the Leper Asylum at Belgaum, during the last two years, consists, he says, of: 1. *Local applications.*—The patient was made to rub carbolic acid and sweet oil (1 in 40), early in the morning for a couple of hours, all over the body, and then bathe at about 9 A.M. with soap and warm water; afterwards to rub in an emulsion of gurjon oil made according to Dr. Dougall's formula (viz., gurjon oil 1 part, lime-water 3 parts, churned well together so as to form a thin ointment of a creamy consistence) over the affected parts, and fill in the ulcerations with cotton-wool smeared with the emulsion.

The ulcers healed rapidly, even such as had remained open for several years, but the anæsthetic parts and tubercles remained much the same; and except in one or two instances, where it was alleged by the patients that the tubercles were

softening, I noticed no change in them. This induced me to try the cashew-nut oil, which has been so successful in the hands of Dr. Beauperthuy. The result of my trial was so satisfactory, that some of the oldest patients, who had no hope of being ever relieved in the slightest degree, took to it kindly in spite of the pain and discomfort arising from the blisters which the application of the oil over extensive surfaces gave rise to; and on seeing that they were benefited, they sent for their friends not in the asylum and placed them under treatment.

Briefly, then, I have used *externally*:—

1. As a general application, carbolated oil (1 in 40) rubbed over the whole body, to promote healthy action of the skin, followed by soap and warm water ablution.

2. For ulcerated parts, an emulsion of gurjon oil and lime-water (1 in 3), applied by means of cotton-wool and bandages as well as by friction.

3. For anæsthetic parts and tubercular growths, the application of cashew-nut oil.

Internally, chaulmogra oil in 5-minim doses, in combination with bicarbonate of soda 5 grains and peppermint-water 1 fluidounce.

For a time I used gurjon oil both externally and internally, as recommended by Dr. Dougall; but I was obliged to give up its internal administration in consequence of its ill effects upon the digestive system. In some cases it aggravated the symptoms of indigestion, which is invariably present in leprous subjects, whilst in others it gave rise to diarrhœa, and I did not consider it desirable to weaken the strength of the patients by continuing its administration when we have a much better remedy in chaulmogra oil, especially as the weaker patients were liable to attacks of diarrhœa and dysentery.

As an *external* application, however, gurjon oil is very valuable in the treatment of chronic leprous ulcers, which heal rapidly under its action, and I do not remember seeing in any single instance the cicatrices open out when it has been discontinued, although fresh ulcers may break out in other parts of the limbs, which are similarly healed under its use; and as a proof of its efficacy, it may be stated that the patients always asked for more of this emulsion than the quantity they were allowed.

Gurjon oil is, besides, a cheap article of commerce. The advantages of gurjon oil, then, are the following:—

1. Its rapidly healing action in chronic leprous ulcers.
2. It softens the skin, and preserves the newly-formed cicatrices from cracking.
3. It prevents the collection of flies.
4. Its efficacy in the treatment of chronic skin diseases.
5. Its cheapness.

In the *cashew-nut oil* we have a potent remedy for the dispersion of tubercles. The oil is applied daily over the tubercles until blisters are formed, when it is discontinued. This causes the tubercles to soften and disappear, discharging in some cases an ichorous matter, and leaving an open ulcer. To the ulcerated surface thus formed the gurjon oil emulsion is applied, under which it cicatrizes rapidly.

The application of the cashew-nut oil has to be repeated again when the skin has healed until complete absorption of the tubercle has taken place. Care should be taken not to let it run over the healthy skin or into the eyes.

The cashew-nut oil appears to be beneficial, also, in the anæsthetic form, applied in a similar way over the surface covered with the anæsthetic patches.

Chaulmogra oil, as an internal remedy, acts as an alterative and stimulant tonic. Given in combination with carbonate of soda and peppermint-water, it relieves in the first instance the distressing burning sensation in the stomach aris-

ing from dyspepsia, and the constant morbid craving for food which lepers generally complain of; at the same time it improves the appetite and promotes digestion, and thus leads to the healthy assimilation of food. Some of the patients who have been in the habit of taking alcoholic stimulants have asserted that they experienced a similar effect from its use; and for these reasons, combined with its not unpleasant taste, they preferred it to gurjon oil. Chaulmogra oil, moreover, has been found to have a direct influence in causing absorption of the tubercles, as seen in cases where cashew-nut oil had not been applied, and, therefore, particularly adapted in the treatment of leprosy.

He has used carbolic acid in combination with sweet oil made from ground nuts, sesamum seeds, and the seeds of the *Verbesina sativa*, or cocoa-nut oil, in the proportion of 1 part of the acid to 20 or 40 parts of the oil, as a general application to promote healthy action of the skin, and also as a substitute for gurjon oil when he has not had a supply of the latter; but it is more expensive and less efficacious than gurjon oil in healing leprous ulcers.

Iodide of potassium, he has also used with advantage, especially in cases associated with a syphilitic taint; and he believes it promotes the absorption of the exudation which causes the tubercles.

Diet.—The patients in the asylum received rice and dál (pulse) as their principal meal; mutton once a week, and occasionally fresh fish. Potatoes and some of the ordinary country beans and vegetables were also allowed, which they cultivated themselves in the asylum grounds; but brinjals (*Solanum Melonghana*) and pumpkins, as well as salt fish or meat, were entirely forbidden.—*Edinb. Med. Journ.*, March, 1883.

—

Value of Arsenic in Certain Forms of Anæmia.

A very interesting communication, "On the Arsenical Treatment of Leukæmia, Pseudo-Leukæmia, and Progressive Pernicious Anæmia, with some Remarks on the Mutual Relation of these Diseases," is given by Dr. F. W. WARFVINGE, of Stockholm, in a recent number of the *Nordiskt Medicinskt Arkiv*. It appears that in the space of little more than four years since the Hospital of Sabbatsberg, in Stockholm, has been open, there have been under treatment in that institution no less than eleven cases of progressive pernicious anæmia, and the same number of pseudo-leukæmia, but only two of leukæmia, thus showing that the two former diseases are relatively common in Stockholm, and that they are much more common than leukæmia. The two cases of leukæmia, seven cases of pseudo-leukæmia, and seven of progressive pernicious anæmia were treated with arsenic by Dr. Warfvinge with the following results. One of the cases of leukæmia was of a slightly advanced lymphatic form, and the patient was able to leave the hospital after an arsenical treatment of three months' duration (internally and by injection). He presented all the appearances of perfect cure: the lymphatic glands had returned to their normal dimensions, and the number of white globules was reduced to the ordinary proportion. The other case was of a very advanced splenic form, with an enormous spleen, and the number of white globules was equal to the red ones. The spleen was considerably reduced in size under an arsenical treatment of twelve weeks' duration, the number of white globules was reduced to the proportion of one to ten, and the general health improved at the same time. But the cure was slow, and was only a little advanced when the patient, a feeble girl, sixteen years old, wished to return home. A few injections of Fowler's solution, made in the spleen towards the end of the treatment, were perfectly innocuous.

In the cases of pseudo-leukæmia, the arsenical treatment, which lasted only a

few days, was nearly ineffectual in two instances, one of the patients not wishing to remain in the hospital, and the diagnosis in the other being made only a few days before death. In the remaining five cases the result was more favourable. In one of them, in which iodide of iron had been ineffectually administered, and the cachexia and marasmus had reached an extreme degree, the arsenical treatment for five weeks produced a remarkable, progressive improvement. At the end of this time the patient presented the appearance of excellent health, had a voracious appetite, very good muscular strength, the spleen was normal, and there were only insignificant remains of hypertrophy of the glands, and, besides, the number of red corpuscles had increased. Unfortunately, six months after the patient had gone home from the hospital into the country, where he lived, he had a relapse which ended in death. In another case the arsenic also produced a remarkable effect on the hypertrophy of the glands. This was particularly the case after arsenical injections into the glandular parenchyma, the effect of which was very striking, the diminution of the swellings being rapid and considerable, but confined to the glands which were injected. The patient, who suffered all the time from asthma, had occasionally severe attacks of suffocation, and died in one of them, caused, as was shown at the autopsy, by the pressure of the mediastinal glands, which were much swollen and had not undergone reduction like those which were reached by the injections. In two other less severe cases of lymphatic pseudo-leukæmia the beneficial effect of the arsenic was unquestionable; the use of this remedy for from three to five months produced a slow diminution of the swellings, and such a decided amelioration of the general health that the patients on their discharge from the hospital appeared perfectly well. In the fifth case, a lymphatic pseudo-leukæmia with marked hypertrophy of the glands of the neck and mediastinum together with general prostration, the internal use of arsenic reduced the glandular swellings and brought about a satisfactory general condition, which has lasted for a year.

Of the cases of pernicious progressive anæmia, one rapidly became worse for a week during which iron was administered: the anæmia and cachexia had decidedly increased, and the number of red corpuscles had diminished; but after the employment of arsenic there was uninterrupted improvement, which was so well marked that at the end of two months the patient, being regarded as cured, ceased to take the arsenic, but on the next day after its discontinuance he was attacked with violent acute nephritis terminating in death. The autopsy proved the total absence of the ordinary signs of pernicious anæmia. In another case the patient came to the hospital almost in a dying state, and died in six days in spite of arsenical treatment; but it appeared that at an early period of the affection there had been a decided improvement on two occasions under the use of small doses of arsenic. In the third case iron had been unsuccessfully employed together with other tonics, but on the administration of arsenic there was a continuous improvement. The red globules in three weeks had been increased threefold, and at the end of four months they were eight times more numerous; but two months afterwards there was a relapse, which again yielded to a fresh employment of arsenic, and health was restored, at least for nearly a year, during which Dr. Warfvinge occasionally saw the patient. In the fourth case the symptoms grew worse under the use of iron, but when arsenical treatment was adopted there was a gradual improvement: the health returned, and the number of red corpuscles was quintupled. But there was a relapse at the end of about seven months, and arsenic was again employed: health was again restored, and the red corpuscles were increased in number; a persistent diarrhœa, however, compelled the discontinuance of the arsenic, and the patient died from weakness. In the fifth case the malady was increased under the use of iron, and the patient

was at the worst when arsenical treatment was begun, but from that time there was marked improvement: the patient was able to leave his bed at the end of five weeks, and the blood was two-and-a-half times richer; when he left the hospital the number of red corpuscles was about four times more than at the beginning of the treatment. In the sixth case, which was less advanced, iron in large doses produced no effect, but after only eight days of treatment by arsenic the patient began to improve, and presented the appearance of health at the end of five weeks, the number of corpuscles being tripled. In the seventh case the result of the arsenical treatment was equally favourable: the health of the patient was remarkably improved after two months and a half of treatment, and the number of red corpuscles was largely augmented. It appears, however, that the patient died abroad, probably from a relapse. Dr. Warfvinge adds that two cases of pernicious anæmia are still under his treatment, and are slowly but uninterruptedly improving.

Dr. Warfvinge remarks that the fact of these three maladies—pernicious anæmia, leukæmia, and pseudo-leukæmia—being equally benefited by the use of arsenic seems to show a certain degree of relationship between them, and in proof of this position he passes in review the principal symptoms presented and the anatomical and pathological changes, particularly insisting on the changes in the blood. Although the three diseases exhibit certain points of difference, there is yet a character common to them all, namely, the diminution of the number of red corpuscles, with a modification of their form and size, the diminution depending less on the decrease in the formation of new corpuscles than on the abnormal destruction of the existing corpuscles. Dr. Warfvinge regards the alteration in the blood as the primary cause of these maladies, and he considers as secondary affections, caused by dyscrasic irritation, not only the changes in the spinal cord, but also the hypertrophy of the lymphatic glands and the spleen, and the lymphatic neoplasms in various situations. The alterations observed in the spinal cord, well known in leukæmia, he has also found in all the cases of pseudo-leukæmia and pernicious anæmia which have been examined after death, and he regards these alterations as common to the three affections, in all of which, moreover, there are anæmia with cachexia, a disposition to hemorrhages, especially of the retina, œdema in various parts and transudations, and fatty degeneration of different organs, especially the heart. The dose of arsenic employed by Dr. Warfvinge was four drops of Fowler's solution given two or thee times a day, and four drops of the same daily when used as an injection.—*Med. Times and Gazette*, Aug. 4, 1883.

SURGERY.

Operative Procedures in Diseases of the Lungs.

Dr. BULL, of Christiania, in a recent paper reports an interesting case bearing on this subject. He also gives a brief review of the literature relating to the operations hitherto performed in diseases of the lungs, together with some observations on the indications connected with the opening of tuberculous cavities, and he draws attention to some new possibilities of limited expiratory expansion of the pectoral wall. The case was that of a man, twenty-nine years old, who entered the State Hospital of Christiania, exhibiting all the signs of advanced pulmonary tuberculosis, such as hectic fever, violent cough, abundant mucopurulent expectoration, emaciation, and anæmia. In the first, and partly in the

second left intercostal space, external to the left sternal border, there was observed during the fits of coughing a considerable and clearly limited expansion of the pectoral coverings, which circumstance was not observed in tranquil breathing. This limited expiratory expansion was considered due to a superficial cavity adherent to the thorax, and, perhaps, ulcerated by the pleural adhesion.

Viewing the possibility of the suspected cavity offering an advanced process of ulceration; of the secretion, incompletely expectorated, flowing into the neighbouring bronchi; considering that the fever and the cough were partly relieved by the opening of the cavity externally by means of drainage and disinfection, and that the expiratory expansion in front might perhaps indicate a commencing perforation of the thoracic wall;—taking all these matters into consideration, it was determined, with the consent of the patient, to try the operation. This was accordingly performed, and after the perforation of the thoracic wall the finger could be introduced into a small empty cavity, limited on all sides by smooth walls, and the base of which was formed by a solid elastic tissue. There was no sound of air entering or going out. The day after the operation, during a fit of coughing, there was a sudden discharge by the wound of a liquid like that of expectoration, and this discharge continued abundant, but without relief to the patient, and death ensued in six days. On post-mortem examination the left lung was found to be separated almost entirely from three to four centimeters from the thoracic wall, and there were only a few filiform adhesions with the upper parts. There was fibrinous pleurisy and a little pus in the pleural cavity. At the apex of the lungs there was a large superficial cavity. In other respects in both the lungs there were the usual indications of phthisis.

The differential diagnosis between a cavity and a pneumothorax in cases such as the above cannot be made with certainty, and considering the possibility of mistake, Dr. Bull advises that pulmonary operations should always be performed with the aid of antiseptics, so that if the incision reveals a pneumothorax the wound may then be closed and the operation be regarded only as "diagnostic." Dr. Bull has found in medical literature the records of nineteen cases in which the opening of pulmonary cavities has been undertaken. Five of these, however, are imperfectly reported, or the diagnosis was too doubtful to be of any service. Of the rest of the cases, two were instances of bronchiectatic cavities, one was a case of bronchiectatic cavity and a cavity consecutive to pneumonia, five were cases of pulmonary abscess, three of pulmonary gangrene, two of tuberculosis, and one of echinococcus of the lung. The results of the operations were as follows, viz.: Cases perfectly cured, two; very marked improvement, two; more or less relief, seven; no ill consequences, one; cases made worse, two. As to the tuberculous cavities, experience is almost entirely wanting as to the effect of artificial pulmonary fistulæ, and it belongs to the future to demonstrate whether an operation of that kind is more dangerous in phthisical patients; but even when this proceeding might appear to be without danger, it should not be performed at a too advanced period of the disease.—*Med. Times and Gazette*, July 14, 1883.

—

Ulcer of the Duodenum.

In a recent number of the *Medizin. Jahrbücher* (1883, hft. i.), is an exhaustive paper on this subject by Dr. Chvostek, of Vienna, in which he brings out the following points in its history:—

1. *Pathogenesis and Etiology.*—The upper portion of the duodenum, in which the perforating ulcer most often occurs, is more directly under the influence of the acid contents of the stomach which play an important part in the pathological anatomy of the affection. The conditions for the origin of duodenal ulcers are

therefore very similar to what we believe to be true in originating round ulcer of the stomach, viz., the action of the gastric juice on a circumscribed portion of the duodenal wall, in which, by some circulatory condition, either by thrombosis or embolism of the small arteries (Virchow), or by some trouble in the venous circulation (Müller, Virchow, Rindfleisch), an extravasation of blood takes place in the mucous membrane and submucous tissue, or, according to Klebs, by ischæmia following spastic contraction of the bloodvessels. The experiments of Panum have shown that obstruction of the calibre of the small arteries can produce these ulcers, and Müller has shown experimentally that obstruction to the circulation in the smaller branches of the portal vein can produce them. More recently Böttcher has sought to explain them as being due to a fungoid origin, and Hlava found, in one case, an ulcer the inflammatory appearances of which led him to believe that it originated in this manner. Finally Aufrecht found that by injecting cantharidin into rabbits an ulcerative process was set up in the mucous membrane of the stomach, with well-marked hyperæmia and capillary stasis. From this Aufrecht concludes that ulcers of the stomach are not due to a primary hyperæmia, but to a primary circumscribed gastro-adenitis. That they may be both due to the same cause is quite probable from the fact that in 237 cases of round ulcer Lebert found them together twenty-four times.

Perforating ulcer occurs much less frequently in the duodenum than in the stomach. In 79 cases of ulcer Rokitansky found it six times; Trier found it twenty-eight times in 261 cases, and Lebert found not a single one in 60 cases uncomplicated by round ulcer of the stomach. Chvostek has been able to find, in medical literature, since 1865, only 50 cases uncomplicated with round ulcer of the stomach. He himself has seen only seven such cases, one of which had an ulcer of the cardia.

The greater number of cases seem to occur between the ages of thirty and sixty years. In 47 cases 26 per cent. occurred before the age of thirty years, 56 per cent. between thirty and sixty. Perforating ulcer of the duodenum occurs much more frequently in males; in 64 cases observed by Kraus, 58 were in males (10 : 1); and Trier found in 54 cases, 45 in males, and 9 in females (5 : 1). Of Chvostek's 8 cases, only 1 was in the female. The general strength and occupation of the individual seem to have no influence in the etiology of the affection. Chlorosis is not so frequently a cause as in ulcer of the stomach. Hunger and want are not frequently causes except when they suddenly come upon an individual accustomed to better circumstances. Alcoholism, especially in the anorexial form, may be a cause.

There is no doubt that extensive burns of the surface of the body frequently cause perforating duodenal ulcers. In 125 cases of intense burn, Holmes found ulcer of the duodenum in 16 cases, and ulcers of other portions of the intestinal canal in 2 cases. Stokes found several ulcers of the duodenum and stomach in one case of severe burn. According to Mayer, the ulceration occurs in seven to fourteen days, and twice as frequently in females as in males. In 8 cases collected by Chvostek the shortest time in the male was two days after the injury (2 cases), and the longest seventeen days (1 case). The shortest in the female was two days (1 case), the majority occurring in ten days and upward. Lardier has reported 2 cases occurring during erysipelas. In a few cases foreign bodies cause perforating ulcers of the duodenum. Malherbe found, in a case of pemphigus, three small ulcers with consecutive peritonitis; Lignerolles observed ulcers of the stomach and duodenum in a case of acute pemphigus, and Barth in one of pellagra; and Ebstein found, in a case of trichinosis, a perforating ulcer of the stomach, the end being hastened by perforation. A certain predisposing cause exists in diseases which directly or indirectly affect the circulation in the duodenum.

a. First those which interfere with the portal circulation in the liver, as cirrhosis of the liver, and cancer of the liver, peritoneum, and pancreas. *b*. Heart diseases causing venous engorgement, followed by stasis in the portal radicles, and emboli in the duodenal vessels. *c*. Chronic pulmonary troubles, especially tuberculosis. Billroth is inclined to think that these cases are, in many instances, of septic origin, especially where the ulcer comes on after an operation, as is sometimes the case. There is a marked tendency to a second ulceration at the site of an ulcer which has cicatrized; a previously existing ulcer also predisposes to the formation of a new ulcer in its vicinity.

Pathological Anatomy.—As a rule there is only one ulcer, seldom two or more. In 58 cases, collected by Chvostek, a single ulcer was found thirty-nine times, two ulcers were found ten times, three and four ulcers were found three times each, and more than four occurred three times. Its most frequent seat is in the superior part of the transverse portion of the duodenum. It is generally round or slightly oval, and from two-fifths to three-fifths of an inch in diameter, though it may be larger. When healing and cicatrization take place, stenosis may result, varying from a very slight degree to almost complete closure of the bowel, with dilatation above the strictured portion, and the setting up of a chronic catarrhal process. A large stenosis, involving almost the whole thickness of the bowel, may cause thrombosis of the portal vein, as in a case reported by Frerichs. The ulcerative process may involve the bloodvessels, erosions of the gastro-duodenalis, pancreatico-duodenalis, and other vessels having been reported. In some cases the whole thickness of the intestinal wall is involved, and blood escapes into the peritoneal cavity. Chvostek has collected 23 cases in which this occurred, and in these cases, besides the hemorrhage into the peritoneal cavity, a circumscribed peritonitis is set up; this, however, may take place without complete perforation. Besides this the inflammatory process may cause adhesions between the duodenal wall and neighbouring organs, and fistulæ or abscesses may result.

Symptoms.—The affection may remain latent and only be discovered when some other disease has carried off the patient, or it may be first discovered when peritonitis is set up, or the patient may die suddenly from hemorrhage due to erosion of a bloodvessel. Of 63 collected by Chvostek, death occurred from perforation in 27 cases, from hemorrhage in 14, exhaustion in 6, pyloric stenosis in 2, 1 each in suppurative pylephlebitis, peritonitis of unknown cause, peritonitis from perforation of a round ulcer of the stomach, tuberculosis, paralysis, aortic aneurism, cerebral syphilis, coma after severe burn, stricture of the intestines after peritonitis, and from erysipelas in 2 cases.

According to Krauss, in one-fifth of the cases collected by him of perforation or hemorrhage there was no noticeable pain. There is, however, even when there is no positive pain, a sensation of pressure and uneasiness in the epigastrium, especially after taking food. In other cases the pain may be very severe, and of a constant gnawing character. Sometimes there is intense cardialgia coming on at a variable time, from half an hour to five hours after eating. Krauss has found the report of a case in which cardialgia after eating was a prominent symptom, having lasted for seven years, and was always relieved by a glass of brandy, though perforation and death ultimately occurred. The cardialgia [more properly enteralgia], after lasting for some time, may end in an attack of vomiting of partially digested food. Vomiting, however, seldom occurs in a case of perforating ulcer. Chvostek found it only thirteen times in 48 cases. In one case, recorded by Lebert, there was stercoraceous vomiting. The locality of the ulcer seems to determine the vomiting in great part; it more often occurs when the ulcer is situated near the pylorus. The pain is usually referred to the epigastric or right hypochondriac region, and is occasionally more violent at night. In chronic cases there may be

periods when the patient feels quite easy for some time, and then the pain seems to return with increased intensity. In the opinion of Krauss a continual pain, as cardialgia, is highly diagnostic of perforating duodenal ulcer. In many cases an uncomfortable sensation is produced by the slightest pressure, even of the clothes upon the abdomen.

Dyspepsia is not a prominent symptom in these cases; usually there is only the uncomfortable sensation in the epigastrium and right hypochondrium after eating. Chvostek agrees with Krauss that constipation is more common than diarrhœa in these cases. In his eight personal observations diarrhœa was present in one only.

Icterus is an infrequent symptom, and when present is due to catarrhal duodenitis and subsequent occlusion of the bile-ducts by the catarrhal products. Krauss has found it reported in two cases, in one of which the catarrhal process had extended to the gall-bladder through a choleo-duodenal fistula. In Chvostek's 8 cases icterus occurred twice, there being a suppurative pylephlebitis in one case.

Profuse bleeding occurs in about one-third of the cases of perforating ulcer. Blood may be vomited or may pass in the stools. The hemorrhage is not unfrequently the direct cause of death. Dyspnœa and orthopnœa occur in ulcer of the duodenum as well as in gastric ulcer. In a case reported by Lebert so much wind accumulated under the diaphragm, from perforation, that pneumothorax had been diagnosticated. In chronic cases the patients gradually emaciate, lose strength, and acquire an earthy colour.

Diagnosis.—The diagnosis of duodenal ulcer is especially difficult. The symptoms are so similar to those of gastric ulcer that it is difficult to diagnosticate between them. A great point is to locate the pain definitely. The pain seldom occurs when the stomach is empty, but comes on after the ingestion of food. In a case diagnosticated by Chvostek during life, the pain came on regularly two hours and a half after breakfast, and three hours after dinner, and passed away after taking wine. This he considers a valuable point in the diagnosis, for had the ulcer been in the stomach the ingestion of wine would have increased it, for, says he, when the ulcer is in the duodenum the ingestion of the stimulant causes the pyloric orifice to contract and stop the passage of food outward. When pain occurs after eating, a diagnosis may be arrived at by seeing the result of full and spare meals. A spare meal, easily digested, is soon passed into the intestine, and the pain comes on sooner and lasts a shorter time than after a full meal of less digestible substances. After severe burns the diagnosis is less difficult, as in this case we may reasonably expect an ulcer of the duodenum. Duodenal ulcers are more frequent in males, the opposite is true with gastric ulcers. In ulcer of the duodenum the pain is less intense and less constant; colic and pain in the back are more constant and severe; vomiting, dyspepsia, and cachectic symptoms are less marked; and icterus, some diarrhœa, profuse hemorrhage and perforating peritonitis are more common than in ulcer of the stomach. Krauss proposes the administration of arsenic as a diagnostic means, as it would increase the pain of gastric ulcer. In some cases the diagnosis cannot be made, nor can we diagnosticate a gastric ulcer from one of the upper part of the duodenum unless we can clearly define the seat of pain. Perforating ulcer is diagnosticated from tuberculous ulcer chiefly by the constant diarrhœa of the latter, and the pulmonary and general symptoms.

Prognosis.—The prognosis of these cases is bad, and even if they recover from the ulcerative process, there is a great tendency to stenosis of the duodenum or of the common bile-duct, which eventually causes ill-health and death.—*Medizinischer Jahrbücher*, 1883, Hft. I.

Resection of the Intestine.

MM. G. Bouilly and G. Assaky give, in the May and July Nos. of the *Revue de Chirurgie*, a critical review of resection of the intestine on account of gangrenous hernia and artificial anus.

Resection and Circular Suture of the Intestine in Gangrenous Hernia.—In the ten years that have elapsed since 1873 thirty-six cases of intestinal resection and suture in strangulated gangrenous hernia have been recorded. Of these there were 21 cases of femoral hernia, 11 cases of inguinal, and one of umbilical hernia, the variety not having been stated in the remaining three cases. The operation was performed 19 times on females, and 5 times on males, the sex not being specified in the remaining cases.

Uninterrupted recovery took place in 9 cases, 7 cases recovered after the formation and spontaneous closure of a stercoraceous fistula, making 16 complete recoveries. A persistent stercoraceous fistula was formed in one case, artificial anus was formed in one, and there were 18 deaths, making a mortality of 50 per cent.

M. Bouilly concludes, from an examination of the clinical histories, that resection of a gangrenous portion of intestine followed by immediate suture of healthy tissues is not only authorized, but indicated, and may be performed:—

1. When the general state of the patient is such that he can stand the operation with the prolonged administration of the chloroform, or where there is not a strong probability of a mortal termination by syncope, shock, vomiting, or pulmonary congestion.

2. When the close examination of the hernia and the actual nature of the accident enable the operator to reject the existence of general peritonitis or other grave complication.

3. When the operator is certain that no fecal matter has escaped into the peritoneal cavity.

4. When the operator believes that he can easily draw out the gangrenous intestine and mesentery, and resect in healthy portions.

5. When the continuity of the intestine can be established without having any great difference in the calibre of the resected ends.

The great dangers of the complete operation are: 1. The possibility of rupture, either by its own insecurity, or from extension of the gangrenous process, and consequent escape of feces; and 2. The persistence of the strangulation.

Resection and Circular Suture of the Intestine in Artificial Anus.—29 cases of enterectomy with enterorrhaphy for artificial anus are given; 17 cases were successful; death occurred in 11 cases, and failure in 1. In the large majority of cases (26) the artificial anus was consecutive to gangrenous strangulated hernia.

M. Bouilly thinks this operation is indicated: 1. In cases in which compression, application of the enterotome, sutures, autoplasty, etc. have not been attended with success.

2. When, after careful examination, the precise condition cannot be made out.

3. When the operator recognizes an abnormal position of the intestinal extremities or superposition, or crossing at a distance from each other, or a marked difference in the calibre of the two extremities, or several perforations at the same point.

4. When there exists an irreducible prolapse of one extremity of the intestine; still more if both extremities be prolapsed.

5. When there is an extensive prolapse of mucous membrane with or without invagination of the subjacent portion of the intestine.

6. When the operator has recognized an artificial anus without a spur-like projection between the two extremities, and accompanied by so large a loss of substance that a suture of the borders of the opening cannot close it.

Resection of the Intestine.

Dr. TERESINO PRATI gives the history of a case in which he resected 2¾ inches of intestine. When the case was seen the diagnosis of *strangulated left crural hernia, entero-epiplocele, which was in all probability gangrenous*, was made. The woman was æt. 61; in her 12th year she had had inguino-crural hernia of the left side, and in the 17th year had umbilical hernia following delivery. No cause could be assigned for the occurrence of the present difficulty; it came on suddenly during the night. Five days after it appeared she came under observation. Prati determined to open the sac, reduce, and, if necessary, perform resection. The patient was chloroformed, the salicylate spray used, the parts washed with a disinfectant solution, and an incision of about 3½ inches in length made along the greatest diameter of the tumour and parallel to the inguino-crural fold. The sac was found filled with sero-sanguinolent fluid, of which it was emptied, and it was then found that a portion of the peritoneum was included in the hernial sac. The intestine was of a dark slate colour, œdematous, and distended with gas. It was also found that there was an adhesion of the intestine to the neck of the sac, which it was impossible to rupture safely. A further examination revealed a large ulcer in the non-mesenteric portion of the circumference of the intestine which had been caught in the neck of the sac. The strangulated portion of the intestine measured about 1½ inch, was œdematous, slate-coloured, and contained the ulcer already mentioned. Fearing that, if the intestine was returned in that manner, there would be perforation and escapes of fecal matter through the ulcer, Prati resected 2¾ inches. Excision of the margin of the ulcer and subsequent suture were not feasible in this case, as a large part of the lumen of the intestine was destroyed. The patient died twenty-eight hours after the operation, apparently from shock.

Prati draws the following conclusions regarding resection of the intestine: 1. Intestinal resection is a rational operation. 2. One may resect a small portion of intestine without completely disturbing the digestive functions. 3. In performing the operation the resected portion must extend into healthy tissues. It is extremely important that the peritoneal surfaces unite by first intention, and in order that this may be brought about, healthy tissues must be brought into apposition. 4. The indications for the operation are carcinoma, epithelioma, and other intestinal tumours, fibrous or cicatricial stenosis, and gangrene from strangulation. 5. The patient may be fed *per orem* with liquid food, or rectal alimentation should be employed No solid substance should be allowed to pass the intestinal wound. 6. It is certain that the patient, in the case reported, died of shock.—*Annali Univers. di Med. e Chir.*, June, 1883.

—

Inguino-properitoneal Hernia.

Dr. MAX OBERST describes a case of this form of hernia which was operated upon in Volkmann's clinique at Halle, in June last. A man, aged 25, had had a scrotal hernia on the left side for eight years, for which he wore a truss. Twenty-four hours before admission to hospital it had come down in consequence of a severe lifting effort, and resisted all attempts at reposition. On admission, he was found to have a left scrotal hernia of considerable size, and there was noted a globular bulging of the abdominal parietes above, and external to the external ring. The scrotal hernia was easily reduced by taxis under chloroform, but immediately returned when the pressure at the ring was removed. When the hernia was reduced the swelling above noted was markedly increased, diminishing again as the hernia was allowed to descend again into the scrotum. Diag-

nosis was made of "Hernia inguino-properitonealis," and as the symptoms were not urgent, the scrotal hernia was reduced, and a bandage applied to retain it in position. Next day the patient was much weaker, complained of pain, and suffered from meteorism and stercoraceous vomiting, and it was found that the hernia had slipped down beneath the bandage. Herniotomy was then performed, and a small atrophied testicle was found lying in the canal beside the loop of bowel, showing the hernia to be a congenital one. The external ring was found to be wide, and the bowel was reduced easily without enlarging the opening, but, as before, came down again whenever pressure was removed. Upon drawing down the intestine so as to permit further digital explorations of the canal, it was found that the gut had not been returned into the abdominal cavity at all, but into a wide space extending between the peritoneum and the overlying tissues towards the anterior superior spine of the ilium, and communicating directly with the sac through the external ring. This cavity communicated with the abdominal cavity by a small, tight, well-defined ring, which was found to be firmly constricting the protruded loop of bowel. When this ring was dilated with the tip of the finger, the bowel was easily replaced in the abdomen, passing away for the first time with characteristic "slip and gurgle." The wound was allowed to heal by granulation, the edges of the sac being stitched to the edges of the external wound, and the patient made a good recovery.

The following references on the subject are given in Dr. Oberst's article: Krönlein, in *v. Langenbeck's Archiv*, Bd. xxv., and *Archiv f. Klin. Chir.*, Bd. xix. and xxii.; Neuber, in *v. Langenbeck's Archiv*, Bd. xxii.; Rossander, in *Hygeia*, Jan. 1881; Trendelenburg, in *Verhandl. d. deut. Gesellsch. f. Chir.*, x.; Kongress and Bolling, in *Berlin Klin. Wochenschr.*, 1882, No. 26.

The special features of this form of hernia are in the description of the case given above; one feature generally noted in such cases is that the symptoms of strangulation are not urgent. In 20 out of 28 recorded cases the hernia was of the congenital form.

The cause of this peculiarity in the congenital form, according to Trendelenburg, is the persistence of a cavity which must exist at a certain stage in the descent of the testis; another instance of arrested development. In acquired cases, according to Krönlein, the cause is mechanical, the pressure of a badly fitting truss or repeated attempts at taxis forcing the internal away from the external ring, and dilating the sac or canal into the pouch between the layers of the parietes.

Dr. Oberst suggests that when the condition is recognized, the internal ring might be dilated with the tip of the forefinger, pushing the skin of the scrotum before it up through the external ring, except, of course, where the condition of the bowel is doubtful. If this fails, herniotomy, as in his own case, is necessary, and if that also failed, then Trendelenburg's method might succeed, viz., laparotomy and reposition of the bowel by traction from within.—*Glasgow Med. Journal*, July, 1883.

Removal of Large Renal Tumour by Abdominal Section.

Dr. Henry G. Rawdon reports the case of a female child, æt. 16 months, first seen on August 31, 1882. The mother stated that she first observed a swelling on the left side about two months previously, and that, coincident with the enlargement, she noticed her becoming fretful and poorly, and getting much thinner.

The child had, for a few weeks prior to admission, been brought as an outpatient; during that time the tumour had increased, but not to any marked extent.

The tumour, which was easily made out, occupied the entire space between the left costal cartilages and the crest of the ilium. It extended at least an inch beyond the median line, and could be felt in the lumbar region. The tumour was to a certain extent movable, and on palpation gave the impression of a solid elastic growth of a globular shape, with a generally smooth surface, but with two or three prominences upon it. The urine was ascertained to be free from blood and albumen. On September 2, under antiseptic precautions, an incision was made in the linea alba, extending about two and a half inches above and an inch below the umbilicus. As soon as all bleeding had ceased, the peritoneum was divided and the tumour reached. The descending colon passed downwards over the tumour, which was very intimately embraced by it, the peritoneal attachment of this intestine being so connected with the tumour that it could only be separated with great difficulty, from fear of laceration.

When the growth was freed from its connections, the pedicle, which included the renal artery and veins, was securely tied with carbolized silk. The ureter—together with some cellular adhesions—was separately ligatured.

The pedicle was now divided at a safe distance from the ligatures, and, after enlargement of the external wound, the tumour was removed. During the operation there was an unavoidable loss of a small quantity of blood—probably not more than an ounce—from tearing adhesions connecting the colon to the tumour in the first instance, and its cellular attachments. Before putting in sutures and closing the wound, the cavity in which the tumour lay in the lumbar region and the pelvis was carefully sponged out, and no oozing was noticed.

The child was much collapsed for two hours, but then slowly rallied fairly well. In the evening she seemed free from pain, was able to take a little nourishment, and appeared to be doing as well as could be expected, but in the night, fifteen hours after the operation, she sank somewhat suddenly.

An examination was made next day. The peritoneum was found to contain about an ounce of altered blood, or sanious serum. The ligatures were found to be secure; the small oozing must, therefore, have come from torn adhesions.

The cause of death was not clear, but suspicion pointed to commencing septicæmia or peritonitis, or possibly it may have been due to the antiseptic (*i. e.*, carbolic spray and dressings).

The tumour was decidedly carcinomatous; it was globular in form; the prominences upon it were more rapid growths of the same kind, only more friable and softer. Internally it contained several cysts, inclosing a deep straw-coloured fluid. It weighed sixteen and a half ounces. No trace of the true renal structure remained.—*Liverpool Med.-Chir. Journ.*, July, 1883.

OPHTHALMOLOGY AND OTOLOGY.

Dilute Solutions of Eserine in Weakness of the Ciliary Muscle.

Dr. JOHN C. UHTHOFF contributes a paper to the *Brit. Med. Journ.*, July 7, 1883, on this subject. The therapeutic use of weak solutions of eserine was first pointed out to him by Mr. Bader, about a year ago; and since then he has made trial of them in a large number of cases of failure of accommodation, and with very considerable success. He generally orders a $\frac{1}{10}$ grain solution to be used three times a day, and he warns the patient that he may experience some unpleasant twitching of the eyelids, and possibly a little dimness of sight, for a short

time, after applying the drops. In some cases benefit has accrued at once, has continued as long as the drops have been used, and has lasted for a varying period after their discontinuance. In some, the improvement has passed off, and I have been obliged to increase the strength of the solution in order to continue the effect. In other cases, and they have been few, no benefit whatever has resulted.

He has found these solutions more especially beneficial in two classes of patients.

The first and chief class consists of cases of slight hypermetropia in young adults, where the error of refraction has caused no defect of vision until—through some failure of general health, or perhaps from overtaxing the eyes by an excess of near work—the power of accommodation has failed, and then there has arisen an array of troubles sufficiently well known; headache after near work, and inability to continue at it for any length of time, especially if by artificial light, being chief among the number. In such patients the treatment is particularly valuable, and may keep the power of near vision at its normal standard, until with rest and an improvement of the general health, the muscle recovers its normal power. As an example of this class he mentions the case of a young lady, who was sent to me suffering from all the troubles incident to the presence of an accommodating power insufficient to compensate for the slight amount of hypermetropia (1 D) which existed. Her sight had been good until a few months before coming to me, when she thought she strained her eyes by doing an unusual amount of near work by artificial light. Her far vision was good, and she could read D 0.5 Snellen for a short time with ease. The use of $\frac{1}{4}\frac{1}{0}$ grain solution of eserine three times a day caused immediate improvement, and at the end of a fortnight she wrote to me saying that she was able to paint and read steadily and with comfort for a much longer period than she had been able to do for six months before.

Secondly: patients with high myopia, even when fitted with suitable glasses, are sometimes unable to use them with any comfort for near vision, this being often in great part due to the feeble accommodating power such myopic eyes possess. These persons will speak gratefully of the benefit they derive from the use of weak solutions of eserine.

—

Trephining the Pyramid of the Petrous Bone.

Gluck attempted on the cadaver to ligate the internal carotid in its canal, and succeeded in fifteen cases in chiselling out the artery in its whole course, without wounding the jugular vein or the transverse sinus. He therefore believes that, in conditions which demand trephining of the mastoid process, we can gain a more radical cure by resection of the pyramid of the temporal bone with the chisel. The author subsequently had an opportunity of proving in a case that such an operation was feasible. A patient with chronic suppuration of the middle ear was suddenly attacked, after previous and repeated hemorrhage from the right ear, with violent headache, sudden fainting, convulsions, and amaurosis, which were followed by a soporous condition, facial paralysis, and paralysis of the right arm. A collection of pus between the dura and pia maters, as a result of the otorrhœa and erosion of the internal carotid, appeared to be the probable condition, and was thus diagnosticated. After chiselling away the posterior wall of the meatus, a portion of the mastoid process and of the temporal bone, the dura mater was extensively exposed, as a bluish, tightly-stretched, fluctuating sac. The dura mater was then opened, whereupon about 60 grm. of thick fetid pus which had lain between the dura and the pia escaped. The finger could be pushed up into the cavity as far as the internal occipital protuberance. Death ensued on the following night. At the post-mortem examination the dura mater

was found sunken into the slightly concave surface of the brain upon the operated side, while its inner surface, from the longitudinal sinus to the base of the brain, was covered with an adherent layer of pus. The base of the skull was unaltered. There does not seem to have been any accurate examination of the ear, from which, however, the disease had its starting-place.—*Archives of Otology*, June, 1883.

MIDWIFERY AND GYNÆCOLOGY.

Extra-Uterine Pregnancy.

Professor A. I. KRASSOWSKI records an interesting case of extra-uterine pregnancy which he successfully interrupted by means of paracentesis through the vaginal fornix. The patient, aged 23, had two normal labours. Her third pregnancy was recognized as extra-uterine by Dr. I. F. Smolensky, who based his diagnosis chiefly on the presence of a gradually growing, moderately movable, painless, ovoid tumour felt in the lesser pelvis through the left half of the vaginal fornix as well as through the thin abdominal wall. From the rather enlarged but empty wound, the tumour was separated by an interspace of a finger's breadth. Having been called to the patient, the author confirmed Smolensky's diagnosis. He found also that the swelling consisted of two distinct parts: the anterior (nearest to the abdominal wall) solid, and the posterior soft and fluctuating. The late Professor M. I. Horwitz and Dr. V. N. Etlinger, consulted by the author, agreed with him in regard both to his view of the case (tubo-ovarian pregnancy about the end of the fourth month), and to the urgent necessity of arresting the further course of pregnancy. Accordingly, a long curved trocar, as large as a raven's quill, was plunged into the fluctuating part of the tumour. About three and a half ounces of a clean transparent fluid escaped, the last portions being tinged with blood. No untoward symptoms followed, except that, from the third to the tenth day after the operation, there was observed some oozing of dark thick blood from the uterus. A month later, quite normal catamenia appeared. The tumour began to shrink and to become denser, more uneven, and more movable. Two months after the operation its size was only a half of the former bulk. The general state of the patient remains quite satisfactory. Professor Krassowski joins Spiegelberg, Schröder, Fränkel, and others in recommending puncture of the ovum in every case of suspected tubal or tubo-ovarian pregnancy.—*London Med. Record*, July, 1883.

Metria.

In the Section of Obstetric Medicine at the annual meeting of the British Medical Association in August, 1883, an interesting and instructive debate occurred on this subject.

Dr. LOMBE ATTHILL, in opening the discussion, said that the pathology of metria is still far from being perfectly understood. Two facts alone are admitted by all who have studied the subject carefully: namely, first, that puerperal women are liable, under certain circumstances, to be inoculated with septic matter conveyed to, and deposited in, the vagina by the hands of the attendants, as well as by other agencies, when, either through carelessness or ignorance, proper precautions have not been adopted to prevent such an occurrence; and that the disease produced by such inoculation is not an unfrequent source of one of the forms

of metria; secondly, that puerperal women may be self-inoculated by poisonous matter originating within their own bodies, from the decomposition of blood-clots formed within the uterus after parturition, or of portions of the membranes or placenta which have been retained *in utero*; the only difference of opinion on this point being, that Dr. Matthews Duncan and others term the disease thus produced "sapræmia"—that is, resulting from the absorption of putrid matter—thus distinguishing it from "septicæmia," or the disease produced by "organisms which, when conveyed to the blood, multiply indefinitely in it;" while those which are the product of putrefaction "do not survive, far less grow, therein." (Dr. Matthews Duncan on Puerperal Fever, *Lancet*, Nov. 6, 1880.)

I hardly think that any one will dispute the correctness of the foregoing points; they have been established beyond all doubt; and it is certain that poison, introduced into the system by one of the two ways indicated, is the cause, in the vast majority of cases, of so-called puerperal fever, whether occurring in private or hospital practice. But there are many who believe that the whole subject is summed up in a belief of these very important propositions, and who think that to go outside of these lines is only to cause difficulty and to create confusion. I admit this; but it seems to me that such an argument is almost an appeal *ad misericordiam*, and that it cannot be admitted for a moment. I believe that, in addition to the two preventable forms alluded to above, we have others; and I ask the members of this Section to consider whether we have not, in addition to these, two other forms of metria, which it may not be possible to guard against—namely:—

1. A form of self-infection, occurring under special conditions, to which I shall allude by and by, which is not preventable by the adoption of any antiseptic treatment.

2. An epidemic, highly infectious, form, which spreads by the same means as ordinary epidemics do.

Before commencing the discussion of these propositions, it is essential to bear in mind that I entirely concur in the opinion now generally held, that septicæmia, occurring in a puerperal woman, is not capable of being communicated to another puerperal patient by any means other than the direct transfer of the infectious matter to some portion of the mucous membrane lining the genital tract. Septicæmia, however, when it attacks a puerperal woman, may be spread by various agencies, as well as by the hands of the attendant—for instance, by the nozzle of a syringe, by the use of infected sponges, by imperfectly washed napkins, bed-linen, etc.; but not through the medium of the air breathed by the patient. Of the truth of this I have not the slightest doubt.

You will observe that I have spoken of the two ordinary forms of puerperal septicæmia as being preventable. It is evident that, with thorough cleanliness, and the use of antiseptic precautions, septic poison should never be introduced into the patient's system by the attendants; further, I believe that it is possible to prevent self-infection in a healthy woman, by adopting precautions to insure a good and permanent contraction of the uterus, and by washing out the uterus whenever we have reason to suspect the existence of clots, etc., in it, with a disinfecting fluid. With the former object, I make it a practice to put all patients in whom a relaxed condition of the uterus exists, on ergot, from the moment labour terminates, continuing its administration for at least a week. I believe a relaxed condition of the uterus to be a very common predisposing cause of self-infection in puerperal women; it favours the formation of clots *in utero*, and also, the orifices of the uterine sinuses being left open, the absorption of septic matter is favoured.

In proof that I do not exaggerate the importance of imperfect contraction of

the uterus, as a main factor in the production of puerperal septicæmia, I may point out that I recently saw, in consultation, three patients suffering from this affection, in all of whom labour had been so rapid that the child was born before the arrival of the medical attendant; and it is a well-known fact that relaxation of the uterus is very liable to follow the too rapid emptying of that organ.

This train of reasoning has led me to believe that imperfect uterine contraction is one of the causes of the frequent occurrence of septicæmia in unmarried women. The mortality from septicæmia amongst them is very great, and there is no doubt but that the great mental distress these poor creatures suffer, interferes with the recuperative process which should take place rapidly in the uterus after parturition. The muscular fibres of the organ do not contract as they should; the blood-supply, consequently, is not cut off, the mouths of the sinuses remain open, the denuded placental site, instead of becoming rapidly restored to its normal condition, becomes unhealthy, and the fetid discharge, which, under these circumstances, takes the place of the normal lochia, either enters the system directly through the open mouths of the placental sinuses, or is absorbed at the site of some fissure in the mucous membrane lining the genital track. This is one form of puerperal septicæmia which I fear is beyond the reach of preventive treatment. No antiseptic precautions can prevent its occurrence, no treatment that I know of will stay its progress. In patients suffering from certain forms of chronic disease a similar condition is observed, and similar results follow.

In my opinion, the infection arising from any of the forms of metria to which I have alluded, cannot be carried by the attendants from one patient to another, if precautions be adopted to prevent it. And only a year ago I was strongly inclined to believe that epidemics of so-called puerperal fever would not occur as long as such precautions were adopted. Those enforced by me among the pupils attending the Rotunda Hospital were the following:—

1. Students attending the practice of the hospital should not undertake *post-mortem* examinations, be engaged in dissections, or attend a hospital containing patients suffering from infectious diseases; and,

2. Before proceeding to examine any patients, they washed their hands in a solution of carbolic acid.

During the first six years and a half of my mastership, these sufficed to prevent the occurrence of anything like an epidemic of so-called puerperal fever. Deaths from septicæmia, especially among unmarried women, from time to time occurred, but the disease never spread; in August last, however, the hospital being at the time extremely healthy, a patient was admitted who complained of pain in the abdomen, and who vomited constantly, the fluid ejected being greenish. She stated that she had been in labour for more than twelve hours, and that, during the whole of that time, she had been vomiting; and it was subsequently elicited that she had been complaining for some days previously, and also that she had been seen, at the commencement of labour, by some practitioner, who advised her to go into hospital. The os, at the time of admission, was about one-third dilated, labour progressed very slowly, and she finally was delivered by the forceps. Vomiting ceased after delivery for a time, but soon recurred, every thing swallowed being ejected, with large quantities of greenish fluid. The abdomen became tympanitic, the pain intense, matters went from bad to worse, and she died on the fourth day after delivery. Her appearance strongly resembled that of a patient suffering from typhus fever.

Another patient was admitted on the same day as the last patient, and she lay for a short time in the bed next to her. The patient's labour also was slow, but it terminated by the natural efforts. She was attacked with symptoms of acute

peritonitis thirty-six hours after delivery, and almost immediately afterwards we noticed a very peculiar, almost black, appearance of the face. The course of the disease was identical with that of the preceding case, but was even more rapid. The first symptoms showed themselves on the morning of the 29th, and she died on the 31st.

The disease now spread rapidly, and so virulent was the epidemic that, out of twenty-nine women admitted during six days which intervened between the delivery of the first patient and the issue of the order to refuse admission to all applicants, eleven women were attacked, and nine died.

The admission of patients being stopped, the wards were thoroughly disinfected, the walls lime-washed, the floors washed with a strong solution of chloride of lime; the cupboards, presses, etc., scoured; the nurses' clothes, as well as their bedding, being washed and aired, and placed in the hot-air chamber. Patients were re-admitted on September 12th; and from that date till the expiration of my mastership on November 4th, during which time 118 women were admitted into the hospital, the health of the patients was excellent, and, I am informed, continues to be so still. No more successful effort to stamp out disease than this was ever recorded. This, and the fact that the epidemic was distinctly imported into the hospital, and that it did not originate in it, are facts as important as they are satisfactory; and though the occurrence of the outbreak was a cause of great distress to me, and though it was a great disappointment that, at the very close of my mastership, such a misfortune should have happened, still these two facts lessened the regret I naturally experienced.

Some years previously, a patient suffering from erysipelas of the head and face was, during the night, sent up to the labour-ward, her condition not having been detected till she was being undressed. The child's head was in the perineum, and she could not be sent out. She was at once removed to a separate ward, and early next morning transferred to a fever hospital; but though her stay in the lying-in hospital was so short, several patients were attacked, not with erysipelas, but with so-called puerperal fever, and one died. The disease was limited to the one ward. I ask you, gentlemen, to consider what the disease attacking these women was. To me it seems to have been a disease originating by the introduction into the system of a puerperal woman of the infection of erysipelas, which infection was modified by the peculiar state of the system and of the blood which exists in puerperal women, and which, therefore, developed an apparently different disease; and I am strongly inclined to the belief that outbreaks of so-called puerperal fever, when it assumes an infectious and epidemic form, are due to the introduction of the poison of some ordinary zymotic disease into the system of a puerperal patient, the symptoms being, under such circumstances, totally different from those occurring in cases of septicæmia.

Dr. Thomas Moore Madden said that having been for upwards of twenty years in practice, and having been for some years connected with the largest lying-in hospital in Great Britain, I have had some opportunity of gaining experience on this subject. I have, therefore, no hesitation in saying that, in common with others who have had similar experience, I am as convinced as I can be of any fact whatever of the existence of puerperal fever or a specific infectious disease peculiar to puerperal women. The entity of this disease is in no way affected by whatever name we may choose to term it; and whether we speak of it as puerperal fever, metria, septicæmia, utero-peritonitis, sapræmia, or by any other appellation, its distinct existence remains unmistakable as that of measles, scarlatina, typhoid or typhus fever, or any other zymotic disease; although its predominant symptoms are varied, as those of these diseases also are, at different periods, and during different epidemics, by the prevailing atmospheric epidemic

constitution, by the general condition of the patient, by the intensity of the septicæmic intoxication in each case, and by a variety of other modifying circumstances.

He regarded it as a zymotic infective disease, prevailing periodically as an epidemic, and being, moreover, endemic in some places, under certain circumstances. It is unquestionable that the disease may result from infection with the poison of other zymotics, such as erysipelas, scarlatina, and typhus fevers, as well as be induced by auto-inoculation with septic matter self-generated in the patient's system, or by hetero-inoculation with septic matter introduced from without.

Amongst the causes of puerperal fever, some reference should be made to laceration, during labour, of the cervix uteri. This accident, especially where the injury has been occasioned by the abuse or premature employment of the forceps before the natural dilatation of the os, is probably a very important, though generally entirely unrecognized, factor in the modern etiology of puerperal septicæmia. Under such circumstances, the danger of rupturing the undilated parts is self-evident. And it is equally obvious that thereby is afforded a ready channel for the auto-inoculation of the patient with any septic poison existing in the lochial discharge, which may be absorbed through the raw edges of the lacerated surfaces, and thus give rise to septicæmia. There can be no question as to the toxic effect of inoculation with even apparently healthy lochial matter; and, therefore, much more likely is this to occur when the lochia are in an abnormal or vitiated condition, as is so generally the case a few days after difficult and instrumental deliveries.

The treatment of puerperal fever, he said, must be governed by the predominant symptom of each case, and depends largely on the prevailing epidemic type of the disease, which varies widely at different times. Even within the comparatively short period included in my own obstetric experience, several changes have taken place in the prevailing type of puerperal fever in successive epidemics, and hence in the treatment required. We now seldom, if ever, meet with the true inflammatory utero-peritonitis, for which, in my student days, mercury with opium, and free depletion by leeching, were almost invariably prescribed. I well remember often seeing the puerperal patient's abdomen covered, under such circumstances, by what the late Dr. McClintock graphically described as a poultice of leeches. And, I may add, that I have still a lively recollection of the benefits derivable, in appropriate cases, from this line of treatment. Within the last fifteen or eighteen years, however, I have never seen a case of puerperal fever in which any form of depletion could be tolerated; the disease having now, in common with all others, assumed an asthenic or typhoid form, and like them appearing more in the character of a septicæmia than of a true inflammatory malady.

Thus, when, some years after my first acquaintance with the practice of the Rotunda as a student, I became one of the medical staff of the same hospital, two forms of puerperal fever came before me; one with marked uterine pain and tenderness and abdominal distension, and the other without any localized pain; both accompanied by a low typhoid condition tending to death, and obviously requiring stimulation, and especially the free use of turpentine by the mouth, by enemata, and by external application in stuping the abdomen. The form of puerperal fever now most frequently met with is distinctly remittent in its type. Several cases of this kind have come under my observation in which the fever was of the tertian character. Still more usually, however, there are daily matutinal remissions. Thus the temperature and pulse in the second week of the illness often fall each morning to little above normal, and again rise throughout the

afternoon, until in the evening the former has reached 105°, and at the same time the pulse becomes about 120.

In the treatment of the remittent forms of puerperal septicæmia, our main reliance must be placed in quinine. This should be given in medium doses of from three to four grains at short intervals of three to four hours, and continued until the pulse and temperature have been sufficiently reduced, and cinchonism has been maintained for some days.

I may here repeat that, with very few exceptions, all the cases of puerperal fever I have recently seen were of an essentially asthenic type, presenting all the symptoms of so-called malignant puerperal fever or septicæmia, and, consequently, were not suitable cases for any form of depletion; but, on the contrary, required the free use of stimulants and nutriment.

Whatever other treatment may be indicated, however, the use, twice daily, of warm antiseptic intra-uterine and vaginal injections is essential in every case of puerperal septicæmia. The use of such injections, for the purpose of thoroughly washing out septic exudations from the cavity of the uterus, is self-evident. But, at the same time, it should be said that they require to be used with far more caution than is generally practised. Nor should we ever fail to impress on the nurse, in such cases, the risk of probably injecting virus into the open uterine sinuses; or, on the other hand, of forcing the injected fluid through the patulous Fallopian tubes. I have more than once seen injury caused, in both these ways, by want of such caution in the use of the ordinary siphon syringe.

Dr. Alexander (Liverpool) said there were two kinds of so-called puerperal fever; the first where the disease was in reality erysipelas, typhus or scarlet fever. In such cases, the epidemic disease modified the conditions of the lochia, and produced a metria that, in its turn, modified the epidemic disease. In the other class of cases, the disease always began in the uterus, and was really a septicæmia dependent on the altered conditions of the uterine contents, produced by obstruction to the flow of lochial fluid, nervous conditions that relaxed the uterus, putrid poison introduced from without, etc. The putrid discharge was absorbed, and poisoned the patient. Acting upon this theory, his treatment had been, whenever the fever was high, to make the uterus contract by pressure of the hand on the abdomen, and put on a firm binder. He gave a dose of ergot and liquor ammoniæ acetatis, continued every four hours. If the patient's temperature did not soon abate, *i. e.*, in a few hours, he washed out the uterus carefully once, and continued the former treatment. Since adopting this treatment, he had had no trouble with puerperal fever. The treatment must be adopted early.

Dr. Wynn Williams (London) considered those cases only as puerperal that were due to septicæmia, which might arise either from within or without the body; when arising from without, there must be suppuration, such as there was in scarlet fever, erysipelas, etc. It generally, however, arose from within, due to the retention of clot or other animal matter becoming putrid. The object, then, was to destroy the septic matter, which was best done by syringing the uterus with tincture of iodine, three drachms to eight ounces of water, and continuing the process until the fluid returned of the same colour as before. Experiments on guinea-pigs had satisfied him that iodine and septic poison could not exist together. A practitioner might surely free himself from all trace of septic poison by placing some grains of iodine in a saucer, and applying a spirit-lamp to the bottom of, and allowing the fumes to fall over his person.

Dr. A. D. Macdonald (Liverpool) was happy to support the view of Dr. Wynn Williams that washing the hands with a weak solution of iodine was a great means of prophylaxis. He had recently attended cases of erysipelas and

of scarlatina—using this solution—and having no metria following. A short time ago, he was called to a case of puerperal fever delivered by a midwife where she, after warming and using the iodine, as well as having a short holiday, had not had a bad case. This case illustrated the communication of the contagium through hand-shaking with a nurse who had attended a case of septicæmia.

Dr. EDIS (London) thought the whole question of metria was of so much importance to the practitioner, that anything throwing light upon it was of interest. Prevention was the key-note: not to allow the patient to drift into powerless labour; to secure efficient contraction of the uterus and expulsion of all the decidua; to be scrupulously cleanly in all the appointments of the lying-in room and in those in attendance there; to avoid all risk of infecting the patient with any contagion, whether exanthematous or otherwise. If febrile symptoms occurred, the proper course was to wash out the uterus, to sustain the patient's powers by appropriate nourishment, and stimulants if necessary, and to encourage rather than check the natural tendency to vomiting or diarrhœa. Quinine and opium should be given, or iron, as might be indicated. The mere name of puerperal fever was merely a comprehensive term to express very many varied conditions occurring in the lying-in patient, and not any specific disease.

Dr. GRAILY HEWITT, in closing the discussion, said that, although the speakers had expressed opinions of a different character, there was a general concurrence on certain important general principles, and that this serious disease must be considered as not only preventable, but in most instances curable. The prevention of the disease was secured, first, by prevention of the introduction of septic matter from without. The autogenetic cases were, he considered, common; and in this class of cases the important point was to raise the health and strength of the patient, and thus prevent absorption by ensuring active contraction of the uterus. Mr. Burton's and Dr. Alexander's observations showed the great importance of uterine contraction in curing the malady. On this subject, he was pleased to find the treatment found so successful by Dr. Alexander was identical with that recommended by himself at the discussion on puerperal fever at the Obstetrical Society of London some years ago. He mentioned a case of mental shock producing severe metria, cured by pressure, copious administration of food, and stimulants. Here the pressure was found sufficient without intra-uterine injection.—*British Medical Journal*, Aug. 11, 1883.

—

Dysmenorrhœa.

Dr. VEDELER, of Christiania, in an exhaustive article on this subject, declares that ergot is a good remedy in severe cases of dysmenorrhœa, though it has not the same action in all cases; the definite indications must be sought, and the history of each case entered into as far as possible.

Mackintosh first definitely described mechanical dysmenorrhœa, though Capuron, Lisfranc, and Fingerhuth had already mentioned a contraction or stricture of the cervical canal as a cause of painful menstruation; and more recently Simpson and Marion Sims have still more clearly described it. In some cases nothing more than an abnormally small uterine cavity can be discovered to account for the dysmenorrhœa. These cases of the affection, often intermittent, are very difficult to recognize.

Vedeler takes issue with Emmet when he says that "every woman, even in health, will experience at least some degree of discomfort at the menstrual period; that she should be entirely free from pain and suffer no inconvenience at this time is an abnormal condition;" and gives three tables of 252 menstruating women who came under treatment for various affections. In none of the cases

was there any pain. The first table includes 59 virgins; in only 12 of these was the cervix in its proper position. The remaining 47 had various degrees of flexion. In 3 the cervix and uterine body were parallel to each other. Of the diseases for which they came under treatment, 8 were anæmic, 11 had cardialgia, 3 chlorosis, 3 amenorrhœa, and 5 cephalalgia, while others complained of bronchitis, neuralgia, etc. The second table includes 101 unmarried women. In 36 cases the axis of the uterus was a straight line, axis normal in 13, anteversion was present in 14 cases, and retroversion in 9. The uterus was flexed in 65 cases. Of the diseases for which they came under treatment anæmia was present in 7 cases, cardialgia in 9, chlorosis in 4, and amenorrhœa in 2, besides other affections. On examination the external os was found to be small in 8 cases. In 19 cases the uterus was small; chronic parametritis of the uterus existed in 3 cases, of the cervix in 6, endometritis in 14, and chronic perimetritis in 4 cases. The third table embraces 92 patients, married; in 44 the uterine axis was a straight line, the axis was normal in 15, there were 20 anteversions, and 9 retroversions. The remaining 47 had more or less flexion. As before stated, there was no pain at the menstrual period in any of these 252 cases, although the axis uteri was markedly abnormal in 56. From this, says Vedeler, it seems that dysmenorrhœa cannot be entirely dependent upon flexion or malposition of the uterus.

As to the second assumed cause of dysmenorrhœa: *Stenosis of the external os.*—How large should the external orifice be in order to call it normal? Vedeler generally uses a Simpson's sound of 4 mm. If his Sims sound of 3 mm. passes the external orifice with such difficulty that the operator has to employ as much force as is safe, he calls it a small orifice, and very small when it is no larger than a large pin-head. The external os was stenosed in 6 per cent. of the 252 cases given above, in 6 of which the orifice was very small; yet there was no pain. Vedeler does not seem to agree with Sinety, that the intensity of the pain depends on the quantity of the menstrual blood, and the exfoliated mucous membrane; if the blood comes slowly and in small quantity, it escapes without causing pain. Nor does he entirely agree with Lombe Atthill in saying that it is not unusual to find a cervical cavity of the size of a pin's head with which dysmenorrhœa is common.

Sims declares that inflammation of the cervical mucous membrane is a cause of dysmenorrhœa; but Vedeler's tables show 5 cases of cervical endometritis in virgins, 12 in unmarried women, and 25 married, in all 42 cases, without pain at the menstrual period. Vedeler further declares that in cervical endometritis, not only a large sound may be passed but in many cases the end of the forefinger may be carried into the cervix.

Cervical myoma and mucous polypi.—These are stated to be causes of dysmenorrhœa, but Vedeler declares that they are extremely rare. Not one case was found in his 252. Further in 5800 patients he has not seen a single case of dysmenorrhœa which was caused by polypi, and only three caused by cervical myoma.

Vedeler then gives a table of 100 cases of dysmenorrhœa, of which 13 were virgins, 47 were unmarried, and 40 married; 82 had had no children, 18 had had one or more. It is seen from the table how commonly dysmenorrhœa and sterility are associated together. In the 100 cases anteflexion was present in 71 cases, retroflexion in 4, the position was normal in 8, anteversion in 6, and retroversion in 11. The cervical canal was of normal direction in 20 per cent., and abnormally curved in 75 per cent.[1] From this it seems that flexions of the uterus, and especially anteflexion, have a great influence in the etiology of dysmenorrhœa, anteflexion being present in 71 per cent. of all the cases. Retroflexion

[1] He fails to account for the other 5 per cent.

was present in 4 per cent., anteversion in 6 per cent., retroversion in 11 per cent., and the position was normal in 8 per cent.

Only 18 of the 100 cases had had any children. The others were nulliparæ. An analysis of the table shows that the 71 per cent. of anteflexed uteri all occurred in nulliparæ. Of the 4 per cent. of retroflexed uteri, 3 per cent. were nulliparæ. Of the nulliparæ 9 per cent. had uteri in normal position, 7 per cent. were anteverted, and 9 per cent. retroverted. From a consideration of these facts Vedeler concludes that *flexions of the uterus* have a marked influence on dysmenorrhœa, while he questions the influence of stenosis of the external os, and of endometritis (as far as its mechanical influence is concerned), and believes that the mechanical theory of dysmenorrhœa will soon be thought of only as a myth.—*Archiv für Gynäkologie*, Bd. xxi. Hft. ii.

—

Pathology and Treatment of Uterine Myoma.

At the meeting of the Obstetrical Society of London, on July 4th, Mr. LAWSON TAIT, during the course of his remarks on this subject, said that the word "myoma" should entirely supersede the incorrect term "uterine fibroid." The growth of ordinary myoma was limited to the period of sexual activity, was influenced by the menstrual function, and probably its ultimate cause would be found in some disturbance of the nervous body which governed that function. The presence of a myoma indefinitely delayed the menopause. Menstruation and ovulation, he thought, were completely independent functions, having perhaps a community of purpose. Removal of the ovaries often did not affect menstruation, but removal of the tubes nearly always did so. But in one case in which he had removed the ovaries, tubes, and part of the fundus uteri, menstruation continued for more than a year. He deprecated the triple subdivision of myomata into submucous, intramural, and subperitoneal. For pathological and surgical purposes, he proposed a new subdivision into the nodular and the concentric. The latter consisted of a uniform hypertrophy of the muscular tissue of the uterus, in the midst of which the canal lay centrally; the tissue of this form was loose, and usually very œdematous. Of the nodular myoma he proposed two sub-varieties, the simple and the multinodular. He believed that each nodule was seated in a central arterial twig, and that its growth was endogenous, the older tissue being on the outside. The dependence of such growth on menstruation was proved by the fact that arrest of menstruation arrested the growth, or even caused the complete disappearance, of such tumours. This had been in several cases brought about by the removal of the Fallopian tubes only. He had treated 54 cases of uterine myoma by removal of the uterine appendages, with 3 deaths, a mortality of 5.5 per cent., a striking contrast to the results of hysterectomy. Of these 51, in 38 the results had been carefully followed, and were everything that was to be desired. In 3, the tumours were, or became, malignant. In 3 others, the tumours continued to grow, although menstruation had been arrested. The author suspected that these were either fibro-cystic, or myoma of the concentric variety, in neither of which forms was the removal of the uterine appendages useful.

THE PRESIDENT was hardly prepared to accept Mr. Tait's classification, but it was not necessarily antagonistic to the one in common use. He agreed with Mr. Tait as to the delay in the menopause in these cases. He would like further evidence as to the sole or even large influence of the tubes in the phenomena of menstruation.

Dr. HERMAN had published a case in which the symptoms of a fibroid polypus first appeared sixteen years after the menopause. The history of patients after

operations like those of Mr. Tait was of great importance, for patients not benefited often did not return to the operator, and he therefore was apt to get a too favourable impression of the results.

Dr. DEWAR asked if Mr. Tait was careful to tie the uterine artery; and whether removal of the Fallopian tubes, leaving the ovaries, was not dangerous. He had seen one case in which the uterine appendages had been removed, and hysterectomy was subsequently required on account of hemorrhage.

Dr. MEADOWS preferred the present classification of fibroid growths to that suggested by Mr. Tait, as being founded on clinical characters, and of great practical value for diagnosis and treatment. He believed that the ovaries, and not the tubes, were the prime movers in menstruation. In one case he had removed the ovaries and left the tubes, and menstruation ceased. He thought there were many exceptions to the rule that uterine fibromata ceased to grow after the menopause. Notwithstanding the high rate of mortality which attended hysterectomy, he preferred it to the removal of the ovaries.

Mr. LAWSON TAIT said that cases of growth of apparent uterine myomata after the menopause needed most careful examination. Occasionally removal of the ovaries arrested menstruation, but this was the exception. He had never knowingly tied the uterine artery, and it would be very difficult to do so.—*British Med. Journal*, July 21, 1883.

Accumulations of Pus in the Uterus.

Prof. N. F. TOLOCHINOFF, of Kieff, describes that rare form of purulent accumulation in the uterine cavity which is occasionally met in old women far advanced in their climacteric period. This affection, references to which the author could find only in English literature (Tilt, R. Barnes, Matthews Duncan, Ashwell, Graily Hewitt), is characterized mainly by periodical discharge of offensive pus through the os, which remains pervious to a sound. The introduction of the latter is always accompanied by the escape of purulent fluid from the womb. The uterine cavity is invariably enlarged, its walls being more or less thinned. The uterus at the level of the internal os is often retroflexed or anteflexed. The patients mostly complain of general weakness, and of constant or periodical pains low down in the pelvis. The periodical increase of pelvic pain coincides with the appearance of purulent discharge. The latter possesses very irritating properties, giving rise to colpitis, distressing pruritus of the external genitals, chronic eczema of the thighs, etc. Many of the patients present yellowish pallor of the face.

Passing to the theory of these cases, Professor Tolochinoff comes to the conclusion that the affection results from anterior catarrh of long standing. Any slight obstruction (as caused by a flexion or initial cancerous consolidation of the cervical tissues) to the escape of uterine discharge may lead to retention of the secretion, with gradual distension of the thin walls of the atrophic senile womb. Under the influence of the air which still can penetrate through the pervious os, the retained catarrhal fluid undergoes decomposition, acting very irritatingly on the mucous membrane, and producing ulceration with more or less abundant purulent secretion. (In the author's cases the quantity of pus discharged at a time was not more than one or two tablespoonfuls; but in Ashwell's case it was about ten ounces.)

The author details two of his cases of the affection in question, and the treatment they underwent. In one of the cases, Duncan's intra-uterine injections of nitrate of silver, Barnes's introduction of solid sulphate of zinc, and injections of tincture of iodine and salicylic acid, brought only slight relief. The author decided then to treat the uterine cavity as if it were an abscess. Accordingly, he

introduced an intra-uterine pessary in the shape of a silver drainage-tube and daily washed the womb through it with one per cent. solution of carbolic acid. A considerable improvement both of the local conditions and of the general health followed. The occasional removal of the drainage-pessary was followed within two or three weeks by the return of pelvic pains, purulent discharge, and general symptoms. By the end of two years, complete recovery was seemingly obtained: the uterine cavity decreased from 8 to 6 centimetres; the discharge ceased, and did not reappear after taking out the intra-uterine tube. The other patient is still under observation.—*London Med. Record*, July, 1883.

—

Puerperal Inversion of the Uterus.

Prof. BRAUN, of Vienna, reports in the *Wiener Med. Blätter*, Feb. 22, the following interesting case, with remarks: A primapara, æt. 20, well nourished, but somewhat flabby and moderately plethoric, was delivered naturally of a healthy male child, about five hours after the rupture of the membranes, at 3 A. M. on July 1. A few minutes later, without any traction having been made on the umbilical cord, a bag of membranes filled with blood protruded from the vulva and soon burst, discharging an enormous quantity of blood, mostly fluid, followed immediately by the inverted uterus with the placenta partly attached to its surface. The attendant, whose hand had been gently rubbing the abdomen, felt it at the same time suddenly empty. The uterus was replaced within the vulva, the placenta detaching itself in the process, and taxis was applied with the flexor surface of the fingers of the left hand. The right wall, corresponding to the pressure of the four fingers, was reduced first, and the other followed at once. Friction was then applied to the uterine wall by the right hand on the abdomen, against the left in the uterine cavity. Two quarts of a 2 per cent. carbolic solution were injected into the uterus, followed by four quarts of cold water, and subcutaneous injections of ergotin were employed. The patient had lost more than 63 ounces of blood, had almost lost consciousness, and was nearly pulseless. The lower extremities were, therefore, entirely enveloped in elastic bandages, the hip raised, and ether injections, tea with rum, etc. administered, until the pulse became moderately strong, and about 104 in the minute. The temperature was not taken on account of the necessity of keeping the patient warmly covered. Ice was placed on the abdomen, and no massage employed, and the uterus contracted so well that five stools passed within the twenty-four hours without causing any attempt at inversion. In spite of the free administration of stimulants and fluid nourishment, by mouth and rectum, the heart's action increased until on the evening of the second day the pulse was 152, with a temperature of 97.16° F., and a disproportion between pulse and temperature was still present two weeks afterwards. The importance of the auto-transfusion by means of the elastic bandages was shown by the subsequent history. When they were only partially loosened on the thigh, after four hours, symptoms of threatening collapse necessitated their re-application in a quarter of an hour; the attempt some hours later to bandage an arm and set free one leg produced dizziness, and the bandages could not be fully removed until after nineteen hours.

This case went on to complete involution of the uterus and usual health, and shows the operation of complete atony of at least a portion of the uterus in the production of inversion, which may then be induced even by the pressure of the abdominal muscles, so that it is not necessary to refer it always to external influences. The blood liberated by the partial detachment of the placenta collects between it and the uterine walls, flows into the membranes, and presses them down to the vulva, out of which they protrude, the blood behind meanwhile

dilating the lower segment of the uterus. The sudden bursting of the membranes and escape of the blood causes the inversion of the distended uterus, a partial inversion having probably already begun at the uncontracted seat of placental attachment, which may have been aided by traction on the part of the membranes.

Inversion is not so rare in primipara as has been imagined, and the following are the causes of its production in them:—

1. Feebleness of uterine contractions from the length of the labour, even when it is terminated by forceps, is the first cause.

2. Attachment of the placenta to the fundus, which is more common in primiparæ, predisposes to inversion.

3. The tense vaginal walls do not give under the downward force, and therefore do not so easily prevent inversion.

4. The narrow vulva serves to hinder the outflow of the blood, and so facilitates inversion through distension, and subsequent sudden escape of the blood.

In multiparæ, a predisposition to inversion may be occasioned by adherent placenta in previous labours.—*Lond. Med. Record*, July 15, 1883.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

Diffusion of Arsenic through the Body when thrown into the Mouth and Rectum after Death.

A recent murder trial in Michigan has brought out some new facts regarding the post-mortem diffusion of poisonous substances, which are substantially as follows: After the death of a lady, whose symptoms strongly pointed to arsenic poisoning, the husband, with a view of preserving the body for removal, injected arsenic suspended in water into the mouth and rectum. He claims to have put about a teaspoonful of arsenic into a teacupful of water, and to have injected one syringeful into the mouth and two into the rectum. The syringe which he claims to have used was an ordinary bulb syringe, with rectal tube attached.

One hundred and five days after her death the body was taken up, and the stomach and rectum placed in one jar, and a piece of the liver and one kidney in another; and the jars were sent to Prof. A. B. Prescott for analysis of their contents. Dr. Prescott found in the stomach and rectum together about twenty grains of arsenious oxide, and from his analysis he calculated the amount in the whole liver to be from six to fifteen grains, according to the size of that organ. Later the body was again taken up, and the brain and a part of the muscles of the calf of the leg sent to Prof. Prescott for analysis. In these he failed to find any poison.

The question asked the experts, and the one which this paper considers, was: "Granting that the arsenic was injected into the mouth and rectum in the manner claimed, could it reach the liver and other organs outside the alimentary canal?" This was the main question, and on it the experts were divided.

In order to determine this question, Drs. Vaughan and Dawson made the following experiments: A large musk-rat was killed, and about 50 grains (3.24 grammes) of arsenious oxide suspended in cold water were injected with an ordinary bulb syringe with rectal tube attached into the mouth and rectum. The rat was placed in a pine box and buried. After twenty-five days it was disinterred, and the various organs removed and subjected to analysis.

The lungs contained a much larger amount of arsenic than the stomach. Evidently the larger portion of that injected into the mouth passed down the trachea instead of going down the œsophagus—indeed, the amount found in the liver is larger than that found in the stomach. It is likely that the poison passed from the lungs into the liver. The amount found in the brain is large, but in the musk-rat the bones of the skull are thin in texture, and are not firmly united.

In the second experiment a cadaver was used. The person had been dead between two and three days when the injection was made. An unweighed quantity of arsenious oxide was suspended in cold water, and this was injected by means of a common bulb syringe, with rectal tube, into the mouth and rectum. The body was laid away in a dry cellar for twenty-five days. The various parts of the body were then removed, weighed, and subjected to analysis. In dissecting the body, it was observed that, although the cuticle had decomposed to a certain extent, the internal organs were firm to the touch, and remained in a fair state of preservation. This was true of all the parts removed, except the brain, which was broken down to a semi-fluid condition.

While the right kidney contained only an unweighable quantity, the left kidney furnished nearly as large a per cent. of arsenic as was furnished by the liver. We account for this by supposing that on the right side the liver caught up the greater portion of the arsenic passing down from the right lung, while on the left side the arsenic passed on more freely into the kidney. Contrary to what was observed in the experiments on the musk-rat, the stomach of the cadaver contained a large amount of arsenic, and it seems probable that some of the fluid thrown into the mouth passed directly into the stomach. We were surprised at finding the arsenic in the brain, and the query arises, by what avenue did the poison reach this organ? We noticed that, while throwing the fluid into the mouth at one time, when the bulb of the syringe was very forcibly compressed, a portion of the fluid returned through the nose. It is probable that some of the arsenic adhered to the roof of the pharynx and along the nasal passages, and from thence penetrated the brain.

It will be seen from these experiments that the arsenic was quite as widely diffused through the body as it would have been had it been administered during life, and had it been the cause of death. These experiments also show that in a case of suspected arsenical poisoning, if arsenic has been introduced into the mouth and rectum in the manner above given after death, the finding of the poison in the various organs mentioned will be no proof that the poison was administered during life and caused death. Now, embalming fluids containing arsenic are quite generally and indiscriminately used. They are used by the physician, by the undertaker, and by others who prepare the body for burial. Some throw the fluid into the mouth or rectum, or both; some puncture the abdominal walls with a trocar and then fill the cavity with the fluid; others simply bathe the body with some soluble form of arsenic, or cover the body with cloths saturated with such a solution; others still inject a solution of arsenic into an artery. The most weighty argument yet urged against cremation is that it may be used as a means of covering up crime; but in a case of arsenical poisoning the use of an arsenical embalming fluid may be employed as a more certain method of covering up the crime than the incineration of the body would be. On the other hand, as long as the present frequent use of these embalming fluids continues, some innocent person may be accused of committing murder by arsenical poisoning, and, arsenic being found in the body, may suffer an unjust sentence.

In all of these experiments, not only were "chemically pure" reagents used, but these were thoroughly tested for arsenic.—*Journ. of the American Med. Assoc.*, Aug. 4, 1883.

INDEX.

A.

Abdomen, hydatid tumours of, 506
Abdominal surgery, 509
——— wall, excision of, 274
Abnormalities observed at Guy's Hospital, 514
Abscess of iliac fossa, 463
———, perisplenic, 266
Abscesses of neck causing sudden death, 321
Acetal and paraldehyde, 556
Acetonuria, 563
Aconitine poisoning, 516
Adenoma of kidney, 568
Albuminuria of Bright's, nature of, 570
———, relation between serum-albumen and globulin in, 572
Allen, Human Anatomy, review of, 229
Altounian, lithotomy statistics, 151
Amputation of hip, control of hemorrhage after, 280
Anæmia, arsenic in, 576
———, idiopathic, 515
Anæsthetic action of chloroform and mixture of air, 555
Aneurism, galvano-puncture in, 447
Angina pectoris, nitric and nitrous compounds in, 262
———, treatment of, 262
Angioma of scalp, removal by elastic ligature, 271
Aortic valves, disease of, 503
Area, reflex of nose, 106
Arkansas, Health Report for 1882, review of, 535
Arsenic in anæmia, 576
———, post-mortem diffusion of, 597
Asthma, bronchial, pathology, 565
Atkinson, iodine in malarial fever, 63
Atlee, abscess of the left iliac fossa, 463

B.

Bacteria, review of, 531
Barium chloride, physiological action of, 550
Belfield, micro-organisms and disease, 531
Bismuth treatment of wounds, 248, 249
Bladder and rectum, physiology of, 550
Bones, tarsal, removal in tabetic arthropathy, 258
Brain and cord, contusions of, 31
Bright's disease, albuminuria of, 570
Bronchial glands, enlargement of, 125
Bruen, enlarged bronchial glands and pneumogastric irritation, 125
Burr on primary monomania, 93

C.

Cæsarean, Porro-, classification, 490
———, operation, 477
Calculous affections of pancreatic ducts, 404
Carotid, ligation of, 282
Cathartics, saline, action of, 551
Chambers, galvano-puncture in aneurism, 447
Chatin, La Trichine et la Trichinose, review of, 227
Chloroform and air, mixture of, as anæsthetic, 555
Chloroma, 287
Cholera, treatment of, 561
Chyluria and hæmato-chyluria, 573
Ciliary weakness, eserine in, 586
Cinchonide, physiological effects of, 243
Circulation of kidney during fever, 380
Cohen, immobility of one vocal band, 84
Cohn on Bacteria, review of, 531
Colon, percussion of, in diarrhœa, 267
Coma, diabetic, 563
———, uræmic, and of cerebral hemorrhage, 254
Concussion, spinal, 493
Connecticut, Report of the State Board of Health for 1882, review of, 210
Conner, on excisions of the tarsus, 362
Constipation, habitual, 266
Cord, contusions of brain and, 31
Corpora striata, symmetrical softening of, 513
Cough, nasal, 106
Coxalgia, subcutaneous osteotomy in, 101
Croup and diphtheria, tracheotomy, 272
Cystotomy after nephrectomy, 275
Cysts of kidneys drained, with ovariotomy, 292

D.

Diabetes in children, 561
———, puerperal, 196
Diabetic coma, 563

Diarrhœa, percussion of colon in diagnosis of, 267
Diphtheria and croup, tracheotomy in, 272
Disease germs, 531
Dispensatory, United States, review of, 215
Distoma hæmatobium, alterations produced by, 268
Duhring, Paget's disease of nipple, 116
Duodenum, ulcer of, 579
Dysmenorrhœa, 194, 594

E.

Emmet's operation, 193
Emphysema after whooping-cough, 147
Empyema, removal of portion of rib in, 513
Enchondromata of salivary glands, 515
Enteric fever, 505
——— ———, analysis of 31 cases, 505
——— ———, erythematous eruption in, 250
Erb, Electro-therapeutics, review of, 545
Ergotinine, in post-partum hemorrhage, 197
Erysipelas, micrococcus of, 253
Eserine in ciliary weakness, 586
Eucalyptus steam in infectious diseases, 244
Excision of abdominal wall, 274

F.

Fecal retention, 506
Fenwick, excision of knee-joint, 538
Fever, circulation of kidney during, 380
———, resorcin in, 558
Fibroma of round ligament, 295
Fischer, Das Naphthalin, review of, 237
Fletcher, experiments on serpent venom, 131

G.

Galvano-puncture in aneurism, 447
Gamgee on Wounds and Fractures, review of, 540
Gangrene, tachetic symmetrical, 255
Germs, disease, 531
Goitre, excision of, 532
———, exophthalmic, mental disorders in, 513
Gradle on Bacteria, review of, 531
Grant on an anomaly of the heart, 149
Gray's Anatomy, review of, 546
Grossmann, a modified Porro-Cæsarean operation, 477
Guy's Hospital Reports, review of, 512
Gynæcology, sharp spoon in, 295

H.

Hæmaglobinæmia, 559
Hæmato-chyluria and chyluria, 573
Hair tumour in abdomen, 279
Hamilton, Types of Insanity, review of, 540
Hammond on Insanity, review of, 521
Harris, classification of the Porro operations, 430
Harrison on Lithotomy, Lithotrity, etc., review of, 545
Hay on action of saline cathartics, 551
Health Reports, review of, 210
Heart, anomaly of, 149
Heart, tricælian, 505
Hemianæsthesia, 515
Hemorrhage after placenta prævia, 289
——— by vaso-motor irritation, 243
———, control of, in hip amputation, Lloyd, 280
———, fatal, from rectal nævus, 279
———, post-partum, ergotinine in, 197
Hernia, inguino-properitoneal, 584
Hoffman and Power, Chemical Analysis, review of, 235
Holmes, Medical Essays, review of, 219
Hospital Reports, Guy's, review of, 512
———, St. Thomas's, review of, 503
Hydatid tumours of abdomen, 506
Hyde, Diseases of the Skin, review of, 222
Hygiene, review on, 206
Hyoscyamia in psychiatric practice, 553

I.

Iliac fossa, abscess of, 463
Infectious diseases, eucalyptus steam in, 244
Inhalations in pulmonary disease, 260
Intestine, resection of, 278
Intraperitoneal injections in poisoning, 296
Iodine in malarial fevers, 63
Iodoform, 554
——— in chronic pulmonary disease, 261

J.

James, Sore Throat, review of, 240
Jaws, closure of, treatment, 454
Jenckes on radical cure of varicocele, 153
Jennings, Transfusion, review of, 233
Johnson on calculi of the pancreatic ducts, 404

K.

Keratitis, experimental, 120
Kidney, adenoma of, 568
———, circulation of during fever, 380
———, cysts of, drainage, 292
———, fatty transformation of, 567
———, tumour of, removal, 585
Knee, excision of, 538
———, resection of, 286
Kymographic measurements in man, 549

L.

Lead poisoning, lunacy in, 515
Leprosy, treatment of, 574
Leucoderma, 269
Lidell, abscesses of neck, 321
———, contusions of brain and cord, 31
Liebrecht, excision of goitre, review of, 532
Ligation by two ligatures and division of vessel between them, 281
Lithotomy statistics, 151
Liver, partial regeneration of, 241
Lunacy, saturnine, 515
Lung, emphysema and abscess of, after pertussis, 147
Lungs, operative procedures on, 588
Lymphatic system, primary radicles of, 547

M.

Mackenzie on reflex nasal cough, 106
Magnin, The Bacteria, review of, 531

Maguire on The Bacteria, review, 531
Malarial fevers, iodine in, 63
McKay on otorrhœa with perforation of membrana tympani, 468
Mears on closure of the jaws, 454
Medical and Surgical History of the War of the Rebellion, review of, 155
Medico-Chirurgical Society of Edinburgh, Transactions, review of, 529
Melituria after scarlatina, 562
Mendelson, renal circulation during fever, 380
Meningitis, ataxic, nerve stretching in, 508
Mental disorders in exophthalmic goitre, 513
Metria, 299, 588
Michel, ligation of the subclavian, 439
Michigan, Health Report for 1882, review of, 210
Micrococcus of erysipelas, 253
Minor on experimental keratitis, 120
——— the field of vision, 77
Mitchell on lesions of nerve-trunks, 17
Monomania, primary, 93
Morison on the prurigo papule, 341
Myoma, uterine, pathology and treatment, 596

N.

Nævus of rectum, fatal hemorrhage, 279
Naphthalin, review of, 237
Naphtol in skin diseases, 479
Nasal cough, 106
Navy, Sanitary and Statistical Report of the Surgeon-General of, for 1881, review of, 517
Neck, abscess of, causing sudden death, 321
——, pulsating tumour at root of, 514
Nephrectomy, 276
———, cystotomy after, 275
——— for rupture of kidney, 275
Nerve stretching, Ceccherelli, 283
——— in ataxic meningitis, 508
Nerve-trunks, lesions of peripheral, 17
Nettleship, Diseases of the Eye, review of, 239
New Hampshire, Health Report for 1882, review of, 535
New Jersey, Report of the State Board of Health, for 1882, review of, 210
Nipple, Paget's disease of, 116
Nitro-glycerine, therapeutic use of, 246
Northrup, emphysema after whooping-cough, 147
Nose cough, 106
——, reflex area of, 106

O.

Obstetrical Society of London, Transactions, review of, 193
Œsophagus, primary stenosis, 259
Ontario, Report of Board of Health for 1882, review of, 210
Osteotomy in coxalgia, 101
Otorrhœa, clinical observations on, 468
Ovarian tumours, solid, propriety of operating, 293
Ovariotomy and drainage of renal cysts, 292

P.

Page, Spinal Concussion, review of, 493
Paget's disease of nipple, 116
Pancreatic ducts, calculous affections of, 404
Paraldehyde, acetal and, 556
Parkes, Practical Hygiene, review of, 206
Pericarditis, purulent, free incision, 263
Perisplenic abscess, 266
Pertussis, emphysema after, 147
———, resorcin in, 564
Petrous bone, trephining, 587
Phosphorus poisoning, oil of turpentine in, 513
Piperidin, action of, 553
Placenta prævia, treatment of, 288
——— post-partum hemorrhage in, 289
Pneumogastric irritation from enlarged bronchial glands, 125
Poisoning by aconitine, 516
Politzer, Diseases of the Ear, review of, 220
Porro-Cæsarean operation, modified, 477
——— operations, classification of, 430
Pregnancy, complicated by cancer of uterus, 197
———, extra-uterine, 588
———, interstitial, 196
———, tubo-uterine, 196
Prurigo papule, study of, 341
Puerperal diabetes, 196
Purpura, hemorrhage of nerve centres, 255
Pyrexia, paroxysmal, simulating ague, 504

Q.

Quain, Anatomy, review of, 232

R.

Rectum, hemorrhage in nævus of, 279
———, physiology of bladder and, 550
Reflex nasal cough, 106
Renal tumour, removal, 585
Resection of intestine, 278, 583, 584
——— of knee, 286
——— of wrist, 286
Resections, subperiosteal, 284
Resorcin in fevers, 558
——— in pertussis, 564
Reviews—
Allen, System of Human Anatomy, 229
Annual Report of Medical Officer of Local Goverment Board, London, 1881, 190
Arkansas, Health Report for 1882, 535
Belfield, Relations of Micro-organisms to Disease, 531
Chatin, La Trichine et la Trichinose, 227
Cohn, Bacteria, 531
Connecticut, Health Report for 1882, 210
Dispensatory of United States, 215
Erb, Handbook of Electro-Therapeutics, 515
Fenwick, Excision of Knee-joint, 538
Fischer, Das Naphthalin, 237
Gamgee on Wounds and Fractures, 540

Reviews—
Gradle, Bacteria and the Germ Theory, 531
Gray, Anatomy, 546
Guy's Hospital Reports, 512
Hamilton, Types of Insanity, 540
Hammond on Insanity, 521
Harrison on Lithotomy, Lithotrity, etc., 545
Health Reports, 210, 535
Hoffman & Power, Chemical Analysis, 235
Holmes, Medical Essays, 219
Hyde, Diseases of the Skin, 222
James, Sore Throat, 240
Jennings, Transfusion, 233
Liebrecht, Excision du Goître Parenchymateux, 532
Magnin, The Bacteria, 531
Medical and Surgical History of War of Rebellion, 155
Michigan, Health Report of, for 1882, 210
Nettleship, Guide to Diseases of the Eye, 239
New Hampshire, Health Report for 1882, 535
New Jersey, Health Report for 1882, 210
Ontario, Health Report of, for 1882, 210
Page on Spinal Concussion, 493
Parkes, Practical Hygiene, 206
Politzer, Diseases of the Ear, 220
Quain, Elements of Anatomy, 232
Rhode Island, Health Report for 1882, 535
Saint-Germain, Chirurgie Orthopédique, 525
St. Thomas's Hospital Reports, 503
Sanitary and Statistical Report of the Surgeon-General of the Navy for 1881, 517
Sattler, History of Tuberculosis, 530
Sayre, Orthopædic Surgery, 203
Stimson, Treatise on Fractures, 197
Tait, Diseases of the Ovaries, 172
Transactions of Obstetrical Society of London, 193
Transactions of the Medico-Chirurgical Society of Edinburgh, 529
Ziegler, Pathological Anatomy and Pathology, 527
Rib, removal of portion of, in empyema, 513

S.

Saint-Germain, Chirurgie Orthopédique, review of, 525
Saline cathartics, action of, 551
Sattler, History of Tuberculosis, review of, 530
Sayre, Orthopædic Surgery, review of, 203
Scalp, angioma of, 271
Scarlatina and melituria, 562
Semmola on primary radicles of lymphatic system, 547
Septa in vagina, 196
Serpent venom, experiments on, 131
Skin, Diseases of, review on, 222
Skin-flaps, transplantation of, 270
Sorethroat, James on, review of, 240
Spinal concussion, 493
Spleen, healing of wounds of, 275
Splenic, peri-, abscess, 266
———, contusion, 31
Spoon, sharp, in gynæcology, 295
Staining, materials for, 516
Stimson, Treatise on Fractures, review of, 198
Stimulants, subcutaneous injection of, 246
Subclavian, ligation of, 439
Surgery, orthopædic, review of, 203

T.

Tabetic arthropathy, removal of tarsal bones in, 258
Tait, Diseases of Ovaries, review of, 172
Tarsus, excisions of, 362
Tongue, surgical affections of, 514
Trachelorrhaphy, 193
Tracheotomy in croup and diphtheria, 272
Transfusion, review on, 233
Trephining the pyramid of petrous bone, 587
Trichinosis, review on, 227
Tuberculosis, review on, 530
Tubo-uterine gestation, 196
Tumor, pulsating, at root of neck, 514
———, renal, removal of, 585
Turpentine, oil of, in phosphorus poisoning, 513
Typhoid fever, renal form of, 560

U.

Ulceration, catarrhal, 260
Urine ferments and fermentation, 242
———, new crystalline and colouring matter in, 242
Uterine appendages, removal of, 195
———, myoma, 596
Uterus, ablation of, 195
———, epithelioma of, complicating pregnancy, 197

V.

Vaccination during pregnancy, 291
Vagina, transverse septa in, 196
Valves, aortic, diseases of, 503
Van Harlingen, naphtol in skin diseases, 479
Varicocele, radical cure, 153
Vaseline in obstetrics, 291
Veratrine, physiological effects of, 243
Vision, field of, 77
———, new centre of, 548
Vocal bands, immovability of, 84

W.

Wharton, osteotomy in coxalgia, 101
Whooping-cough, emphysema after, 147
———————, resorcin in, 564
Wood & Bache, United States Dispensatory, review of, 215
Woods, iodine in malarial fever, 63
Wounds, bismuth treatment of, 248, 249
———, Gamgee on treatment of, 540
Wrist, resection of, 286

Z.

Ziegler, Pathological Anatomy, review of, 527

BELLEVUE HOSPITAL MEDICAL COLLEGE,

CITY OF NEW YORK.

SESSIONS OF 1883–84.

The standard of Medical Ethics recognized by the College is embodied in the Code of Ethics of the American Medical Association.

The COLLEGIATE YEAR embraces the Regular Winter Session and a Spring Session. The REGULAR SESSION begins on Wednesday, September 19, 1883, and ends about the middle of March, 1884. During this Session, in addition to the regular didactic lectures, two or three hours are daily allotted to clinical instruction. Attendance upon two regular courses of lectures is required for graduation. The SPRING SESSION consists chiefly of recitations from Text-Books. This Session begins about the middle of March, and continues until the middle of June. During this Session, daily recitations in all the departments are held by a corps of Examiners appointed by the Faculty. Short courses of lectures are given on special subjects, and regular clinics are held in the Hospital and in the College building.

FACULTY.

ISAAC E. TAYLOR, M.D.,
Emeritus Prof. of Obstetrics and Diseases of Women and Children, and President of the Faculty.

FORDYCE BARKER, M.D., LL.D.,
Professor of Clinical Midwifery and Diseases of Women.

AUSTIN FLINT, M.D., LL.D.,
Prof. of the Principles and Practice of Medicine, and Clinical Medicine.

FREDERICK S. DENNIS, M.D.,
Professor of Principles and Practice of Surgery and Clinical Surgery.

LEWIS A. SAYRE, M.D.,
Professor of Orthopedic Surgery and Clinical Surgery.

ALEXANDER B. MOTT, M.D.,
Professor of Clinical and Operative Surgery.

WILLIAM T. LUSK, M.D.,
Professor of Obstetrics and Diseases of Women and Children, and Clinical Midwifery.

BENJAMIN W. McCREADY, M.D.,
Emeritus Professor of Materia Medica and Therapeutics.

A. A. SMITH, M.D.,
Professor of Materia Medica and Therapeutics, and Clinical Medicine.

AUSTIN FLINT, JR., M.D.,
Professor of Physiology and Physiological Anatomy, and Secretary of the Faculty.

JOSEPH D. BRYANT, M.D.,
Professor of Anatomy and Clinical Surgery, and Associate Professor of Orthopedic Surgery.

R. OGDEN DOREMUS, M.D., LL.D.,
Professor of Chemistry and Toxicology.

EDWARD G. JANEWAY, M.D.,
Prof. of Diseases of the Nervous System, and Clinical Medicine, and Associate Professor of Principles and Practice of Medicine.

PROFESSORS OF SPECIAL DEPARTMENTS, Etc.

HENRY D. NOYES, M.D.,
Professor of Ophthalmology and Otology.

EDWARD L. KEYES, M.D.,
Prof. of Cutaneous and Genito-Urinary Diseases.

JOHN P. GRAY, M.D., LL.D.,
Professor of Psychological Medicine and Medical Jurisprudence.

WILLIAM H. WELCH, M.D.,
Professor of Pathological Anatomy and General Pathology.

J. LEWIS SMITH, M.D.,
Clinical Professor of Diseases of Children.

BEVERLY ROBINSON, M.D.,
Clinical Professor of Medicine.

FRANCKE H. BOSWORTH, M.D.,
Professor of Diseases of the Throat.

CHARLES A. DOREMUS, M.D., PH.D.,
Professor Adjunct to the Chair of Chemistry and Toxicology.

WILLIAM H. WELCH, M.D.,
Demonstrator of Anatomy.

FEES FOR THE REGULAR SESSION.

Fees for Tickets to all the Lectures, Clinical and Didactic	$140 00
Fees for Students who have attended two full courses at other Medical Colleges, and for Graduates of other Medical Colleges	70 00
Matriculation Fee	5 00
Dissection Fee (includin material for dissection)	10 00
Graduation Fee	30 00

No Fees for Lectures are required of third course Students who have attended their second course at the Bellevue Hospital Medical College.

FEES FOR THE SPRING SESSION.

Matriculation (Ticket valid for the following Winter)	$5 00
Recitations, Clinics and Lectures	40 00
Dissection (Ticket valid for the following Winter)	10 00

For the Annual Circular and Catalogue, giving regulations for graduation and other information, address Prof. AUSTIN FLINT, JR., Secretary, Bellevue Hospital Medical College.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF LOUISIANA—NEW ORLEANS.

FACULTY.

T. G. RICHARDSON, M.D.,
Professor of General and Clinical Surgery.

SAMUEL M. BEMISS, M.D.,
Professor of the Theory and Practice of Medicine and Clinical Medicine

STANFORD E. CHAILLE, M.D.,
Prof. of Physiology and Patholog. Anatomy.

JOSEPH JONES, M.D.,
Prof. of Chemistry and Clinical Medicine.

SAMUEL LOGAN, M.D.,
Professor of Anatomy and Clinical Surgery.

ERNEST S. LEWIS, M.D.,
Professor of General and Clinical Obstetrics and Diseases of Women and Children.

JOHN B. ELLIOTT, M.D.,
Professor of Materia Medica and Therapeutics and Hygiene.

———

Lecturer on Diseases of the Eye

ALBERT B. MILES, M.D.,
Demonstrator of Anatomy.

The next annual course of instruction in this Department (now in the fiftieth year of its existence) will commence on Monday, the 22d day of October, 1883, and terminate on Saturday the 29th day of March, 1884. The first four weeks of the term will be devoted exclusively to Clinical Medicine and Surgery at the Charity Hospital: Practical Chemistry in the Laboratory; and dissections in the spacious and airy Anatomical Rooms of the University.

The means of teaching now at the command of the Faculty are unsurpassed in the United States. Special attention is called to the opportunities presented for

CLINICAL INSTRUCTION.

The Act establishing the University of Louisiana gives the professors of the Medical Department the use of the great Charity Hospital, as a school of practical instruction.

The Charity Hospital contains nearly 700 beds, and received, during the last year, nearly six thousand patients. Its advantages for practical study are unsurpassed by any similar institution in this country. The Medical, Surgical, and Obstetrical Wards are visited by the respective Professors in charge daily, from eight to ten o'clock A. M., at which time all the Students are expected to attend, and familiarize themselves, AT THE BEDSIDE OF THE PATIENTS, with the diagnosis and treatment of all forms of injury and disease.

The regular lectures at the hospital, on Clinical Medicine by Professors Bemiss and Joseph Jones, Surgery by Professors Richardson and Logan, Diseases of Women and Children by Professor Lewis, and Special Pathological Anatomy by Professor Chaille, will be delivered in the amphitheatre on Monday, Wednesday, Thursday and Saturday, from 10 to 12 o'clock, A. M.

The Administrators of the Hospital elect, annually, after competitive examination, FOURTEEN RESIDENT STUDENTS, who are maintained by the Institution.

TERMS.

For the Tickets of all the Professors	$140 00
For the Ticket of Practical Anatomy	10 00
Matriculation Fee	5 00
Graduation Fees	30 00

Candidates for graduates are required to be twenty-one years of age; to have studied three years: to have attended two courses of lectures, and to pass a satisfactory examination.*

Graduates of other respectable schools are admitted upon payment of the Matriculation and half lecture fees. They cannot, however, obtain the Diploma of the University without passing the regular examination and paying the usual Graduation Fee.

As the practical advantages here afforded for a thorough acquaintance with all the branches of medicine and surgery are QUITE EQUAL to those possessed by the schools of New York and Philadelphia, the same fees are charged.

For further information, address

T. G. RICHARDSON, M.D., *Dean.*

* For further information upon these points see circular.

THE

JEFFERSON MEDICAL COLLEGE

OF PHILADELPHIA.

THE Fifty-ninth Session of the Jefferson Medical College will begin on Monday, October 1st, 1883, and will continue until the end of March, 1884. Preliminary Lectures will be held from Monday, 11th of September.

PROFESSORS.

S. D. GROSS, M.D., LL.D., D.C.L. Oxon., LL.D. Cantab. (Emeritus).
Institutes and Practice of Surgery.

ELLERSLIE WALLACE, M.D. (Emeritus).
Obstetrics and Diseases of Women and Children.

J. M. DA COSTA, M.D.,
Practice of Medicine.

WM. H. PANCOAST, M.D.,
General, Descriptive, and Surgical Anatomy.

ROBERT E. ROGERS, M.D.,
Medical Chemistry and Toxicology.

ROBERTS BARTHOLOW, M.D., LL.D.,
Materia Medica and General Therapeutics.

HENRY C. CHAPMAN, M.D.,
Institutes of Medicine and Medical Jurisprudence.

SAMUEL W. GROSS, M.D.,
Principles of Surgery and Clinical Surgery.

JOHN H. BRINTON, M.D.,
Practice of Surgery and Clinical Surgery.

THEOPHILUS PARVIN, M.D., LL.D.,
Obstetrics and Diseases of Women and Children.

WILLIAM THOMSON, M.D.,
Professor of Ophthalmology.

To the usual course of instruction in medical schools, the Medical Faculty of this College have added a thorough system of practical Laboratory work. To each course of the regular curriculum there is appended a Laboratory Course, carried on in large and thoroughly equipped apartments in the College, by specially appointed Demonstrators, under the immediate direction of the Professor. In this way each candidate for the degree of M.D. is immediately and personally taught in Obstetrics and Gynæcology, Physical Diagnosis, Laryngology, Ophthalmology, Medical Chemistry, Pharmacy, Materia Medica and Experimental Therapeutics, Physiology, Histology and Experimental Physiology, and Minor Surgery, Bandaging, Operations on the Cadaver, etc. In the Department of Medicine, "clinical conferences," and practical lessons in Physical Diagnosis, give each student familiarity with all forms of disease. The experience of several Sessions has abundantly demonstrated the great value of this Practical Teaching.

This course of Instruction is *free of charge, but obligatory upon* candidates for the Degree, except those who have had such instruction and those who are Graduates of other Colleges of ten years' standing.

A SPRING COURSE of Lectures is given, beginning early in April, and ending early in June. There is no additional charge for this Course to matriculates of the College, except a registration fee of five dollars; non-matriculates pay forty dollars, *thirty-five of which, however, are credited on the amount of fees paid for the ensuing Winter Course.*

A POST GRADUATE COURSE, very complete in all the details of instruction, has been organized for practitioners only.

CLINICAL INSTRUCTION is given *daily* at the HOSPITAL OF THE JEFFERSON MEDICAL COLLEGE throughout the year by Members of the Faculty, and by the Hospital Staff.

FEES.

Matriculation Fee (paid once)	$5 00	Practical Anatomy	$10 00
Ticket for each Branch (7) $20	140 00	Graduation Fee	30 00

Fees for a full course of Lectures to those who have attended two full courses at other (recognized) Colleges—the matriculation fee, and $70 00
To Graduates of less than ten years of such Colleges—the matriculation fee, and $50 00
To Graduates of ten years, and upwards, of such Colleges—the matriculation fee only.
To Dental Graduates the first course is $60, and the second is $100.
To Graduates in Pharmacy the general ticket is $100 for each year.

The Annual Announcement, giving full particulars, will be sent on application to

ROBERTS BARTHOLOW M.D., *Dean.*

UNIVERSITY OF THE CITY OF NEW YORK,

MEDICAL DEPARTMENT.

410 East Twenty-sixth St., opp. Bellevue Hospital, New York City.

FORTY-THIRD SESSION, 1883-84.

FACULTY OF MEDICINE.

REV. JOHN HALL, D.D., LL.D., *Chancellor of the University, pro tem.*

ALFRED C. POST, M.D., LL.D., Professor Emeritus of Clinical Surgery; President of the Faculty.

CHARLES INSLEE PARDEE, M.D., Dean of the Faculty; Professor of Otology; Surgeon to the Manhattan Eye and Ear Hospital.

J. W. S. ARNOLD, M.D., Emeritus Professor of Physiology and Histology.

JOHN C. DRAPER, M.D., LL.D., Professor of Chemistry.

ALFRED L. LOOMIS, M.D., Professor of Pathology and Practice of Medicine; Visiting Physician to Bellevue Hospital

WM. DARLING, M.D., LL.D., F.R.C.S., Professor of General and Descriptive Anatomy.

WILLIAM H. THOMSON, M.D., Professor of Materia Medica, Therapeutics and Diseases of the Nervous System; Visiting Physician to Bellevue Hospital.

J. WILLISTON WRIGHT, M.D., Professor of Surgery; Visiting Surgeon to Bellevue Hospital.

WM. M. Polk, M.D., Professor of Obstetrics and the Diseases of Women and Children; Gynæcologist to Bellevue Hospital.

LEWIS A. STIMSON, M.D., Professor of Physiology and Physiological Anatomy; Surgeon to Bellevue Hospital; Curator to Bellevue Hospital.

FANEUIL D. WEISSE, M.D., Professor of Practical and Surgical Anatomy; Surgeon to Workhouse Hospital, B. I.

STEPHEN SMITH, M.D., Professor of Clinical Surgery; Surgeon to Bellevue Hospital.

A. E. MACDONALD, LL.B., M.D., Professor of Medical Jurisprudence and Diseases of the Mind; Medical Superintendent of the New York City Asylum for the Insane.

R. A. WITTHAUS, M.D., Professor of Physiological Chemistry.

HERMAN KNAPP, M.D., Professor of Ophthalmology; Surgeon to the Ophthalmic Institute.

S. OAKLEY VANDERPOEL, M.D., LL.D., Professor of Public Hygiene.

AMBROSE L. RANNEY, M.D., Curator of Museum.

JOSEPH E. WINTERS, M.D., Demonstrator of Anatomy.

ADJUNCT LECTURERS.

F. R. S. DRAKE, M.D., Clinical Lecturer on Practice of Medicine; Visiting Physician to Bellevue Hospital.

N. M. SHAFFER, M.D., Clinical Lecturer on Orthopædic Surgery; Surgeon in Charge of the N. Y. Orthopædic Hospital.

P. A. MORROW, M.D. Clinical Lecturer on Dermatology.

JOSEPH E. WINTERS, M.D., Clinical Lecturer on Diseases of Children.

WILLIAM C. JARVIS, M.D., Clinical Lecturer on Laryngology.

LAWRENCE JOHNSON, M.D., Lecturer on Medical Botany.

THE PRELIMINARY SESSION will begin on Wednesday, September 19, 1883, and end October 8, 1883. It will be conducted on the same plan as the Regular Winter Session.

THE REGULAR WINTER SESSION will begin October 3, 1883, and end about the middle of March, 1884. The Plan of Instruction consists of Didactic and Clinical Lectures, recitations and laboratory work in all subjects in which it is practicable. To put the laboratories on a proper footing a new building has been erected at an expense of thirty-five thousand dollars. It will contain laboratories fitted for instruction in Chemistry, Histology, Pathology, Materia Medica, Operative Surgery and Gynæcology.

Two to five Didactic lectures and two or more Clinical lectures will be given each day by members of the Faculty. In addition to the ordinary clinics, *special clinical instruction*, WITHOUT ADDITIONAL EXPENSE will be given to the candidates for graduation during the whole Regular Session. For this purpose the candidates will be divided into sections of twenty-five members each. At these special clinics students will have excellent opportunities to make and verify diagnoses, and watch the effects of treatment. They will be held in the Wards of the Hospitals and at the Public and College Dispensaries.

Each of the seven professors of the Regular Faculty will conduct a recitation on his subject one evening each week. Students are thus enabled to make up for lost lectures, and prepare themselves properly for their final examinations without additional expense.

THE SPRING SESSION will begin about the middle of March and end the last week in May. The daily Clinics and Special Practical Courses will be the same as in the Winter Session, and there will be Lectures on Special Subjects by the Members of the Faculty. It is supplementary to the Regular Winter Session. Nine months of continued instruction are thus secured to all students of the University who desire a thorough course.

FEES.

For course of Lectures	$140 00
Matriculation	5 00
Demonstrator's Fee, including material for dissection	10 00
Final Examination Fee	30 00

For further particulars and circulars address the Dean,

PROF. CHAS. INSLEE PARDEE, M.D.,

University Medical College, 410 East 26th St., New York City.